This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

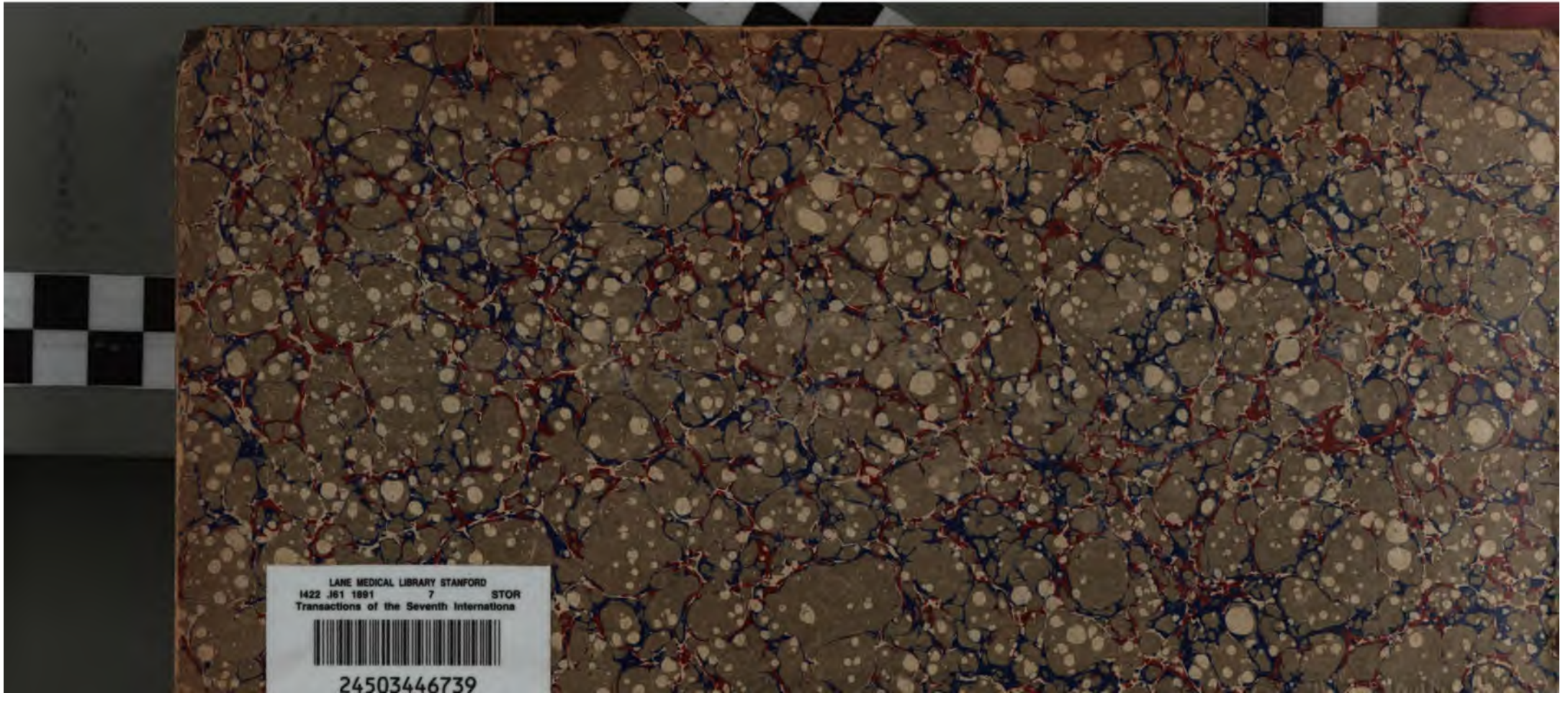
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`


LANE MEDICAL LIBRARY STANFORD
I422 J61 1891 7 STOR
Transactions of the Seventh Internationa
24503446739

LANE
MEDICAL

LIBRARY
JANE LATHROP STANFORD
JEWEL FUND

LANE
MEDICAL

LIBRARY
JANE LATHROP STANFORD
JEWEL FUND

TRANSACTIONS

OF THE

Seventh International Congress of Hygiene and Demography.

LONDON, AUGUST 10TH–17TH, 1891.

Patron:—HER MAJESTY THE QUEEN.

President:—H.R.H. THE PRINCE OF WALES, K.G.

VOLUME IX.

SECTION IX.

STATE HYGIENE.

LANDMARK

EDITED BY C. E. SHELLY, M.A., M.D.,
Assisted by the HONORARY SECRETARIES of the SECTION.

LONDON:
PRINTED BY EYRE AND SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.

1892.

I61
1891
v.9-10

OFFICERS OF THE SECTION.

PRESIDENT.

The Right Hon. Lord Basing.

HONORARY PRESIDENTS.

Signor Alfonso Corradi.
Dr. C. W. Covernton.
Dr. Csatáry de Csatár.
Dr. N. Duncan.
Dr. Ed. Ritter von Hofmann.
Dr. Em. Kusy.
Dr. L. von Markusowszky.
Dr. A. J. Martin.
M. Henri Monod.
Don Juan Vilanova y Piera.
Dr. Pistor.
Dr. W. P. Ruijsch.

VICE-PRESIDENTS.

The Earl Compton, M.P.
Sir Trevor Lawrence, Bart., M.P.
Sir John Lubbock, Bart., M.P., F.R.S.
Sir W. Guyer Hunter, M.D., K.C.M.G., M.P.
Sir B. W. Foster, M.D., M.P.
Sir A. Rollit, LL.D., D.C.L, M.P.
H. E. Armstrong, D. Hy. President of the Society of Medical Officers of Health.
F. W. Barry, M.D., D.Sc., Medical Inspector, Local Government Board.
J. S. Bristowe, M.D., LL.D., F.R.S., Medical Officer of Health for Camberwell, Past President of the Society of Medical Officers of Health.
George Buchanan, M.D., F.R.S., Medical Officer of the Local Government Board.
Charles Cameron, M.D., LL.D., M.P.
T. Orme Dudfield, M.D., Medical Officer of Health for Kensington, Vice-President (Past President) of the Society of Medical Officers of Health.
A. E. Fletcher, F.I.C., F.C.S., H.M.'s Chief Inspector under the Alkali, &c. Act.
R. Farquharson, M.D., LL.D., M.P.
G. W. Hastings, M.P.
S. G. Johnson, Town Clerk of Nottingham.
H. D. Littlejohn, M.D., Medical Officer of Health for Edinburgh.
W. H. Long, M.P. Parliamentary Secretary of the Local Government Board.
G. B. Longstaff, M.A., M.B., F.R.C.P.
Shirley F. Murphy, Medical Officer of Health to the London County Council.
F. S. Powell, M.P.
W. Rathbone, M.P.
J. B. Russell, M.D., LL.D., Medical Officer of Health for Glasgow.
J. F. Tatham, M.D., Medical Officer of Health for Manchester.
R. Thorne Thorne, M.B., F.R.S., Assistant Medical Officer, Local Government Board.

HONORARY SECRETARIES.

John Lithiby, LL.B., Local Government Board.
Louis C. Parkes, M.D., Medical Officer of Health for Chelsea.
B. Arthur Whitelegge, M.D., County Medical Officer of Health for the West Riding of Yorkshire.

38708

TABLE OF CONTENTS.

	Page
Presidential Address	7
The Formation and Organisation of Local Boards of Health	10
Discussion	13
Sanitary Legislation in Ontario (Canada) for the Prevention of Epidemic, Endemic, Epizootic, and other Contagious Diseases	13
Discussion	21
Results of Ten Years' Public Sanitary Work in Dublin	22
Discussion	29
Should the State undertake Scientific Investigations into the Origin and Causes of Disease?	29
Should the State undertake the Support of Laboratories for the Investigation of Disease?	32
Discussion	36
Suggestions for the Constitution of an International Convention on Hygiene	36
American Municipal Hygiene in Relation to the Housing of Labour	38
The Housing of the Poorer Classes	52
The State and the Homes of the Poor	57
On the Housing of the Poorer Classes	60
The Sanitary Registration of Dwellings in regard to Drainage and Water Supply	61
Discussion	65
The present state of British Law Controlling the Discharge of Noxious Gases from Manufacturing Processes	66
Les falsifications des produits commerciaux et les mesures internationales pour leur répression	72
Discussion	74
The extent to which the State should exercise Control in the Interest of Public Health over the Sale of Poisons	74
Discussion	78
On recent Proposals relating to Burial and Cremation, and the Importance of Disinfecting all Bodies dying from Infectious Disease; with Remarks on the Present System of Certifying the Cause of Death	79
The Rational Disposal of the Dead; a Plea for Legislation	86
La Crémation en France	94
Note sur la Crémation à Paris en 1891	103
Assainissement des Cimetières	113
Discussion	115
The Statutory Education and Registration of Architects	119
Discussion	124
The Education, Training, and Status of Sanitary Inspectors	125
The Education, Position, and Duties of Plumbers	139

SECTION IX.

STATE HYGIENE.

Tuesday, 11th August 1891.

The Chair was successively occupied by
The President, LORD BASING.
SIR CHARLES CAMERON (Dublin).
The EARL OF MEATH.

Presidential Address.

Lord Basing, in his introductory address, spoke of the importance of the Congress, which constituted, he said, an epoch in the history of nations. Though he had no professional claim on their attention, it had fallen to his lot to be associated with the administration of public health in this kingdom, and he was therefore cognisant of the successive steps by which that system of administration had been built up during the last half-century. It must be admitted that in England they had never had any attempt by responsible statesmen to lay down *a priori* any code having reference to the public health. The matter had grown up in a somewhat clumsy and English fashion, growing up from the experience of mankind, and gradually ripening to something definite and satisfactory. The provisions of the various public and sanitary Acts which were passed during the early part of the time he alluded to were founded for the most part on the best of all foundations, experience. In the early days when attention was drawn to the need of drainage, water-supply, cleansing, and services of that kind, the great towns of the kingdom, stimulated, no doubt, after a while by the successful working of that great statute, the Municipal Corporations Act, led the way in applying to Parliament for private Acts to enable them to do that which, without parliamentary sanction, they had no legal title or obligation to do, to borrow money and expend it on useful sanitary works, and to improve in that respect the health of the communities over which they held sway. Parliament, therefore, seeing the growing need of administration of the kind, by general Acts enabled urban localities, distinct from the great corporations and towns which already had their municipal organisation, to be set apart, under the designation of

Improvement Commissioners and local board districts, to which were given similar powers and functions. So things went on, and perhaps it was still more characteristic of the state of things which occurred that every visitation of cholera was immediately followed by activity in the passing of fresh sanitary Acts. The visitation of cholera in 1832 stimulated sanitary legislation, with which the name of Chadwick was at that time eminently connected. Subsequent visitations in 1847 and 1854 were followed by further legislation, and after another outbreak Mr. (now Sir) John Simon was appointed to the position which he filled with so much distinction and advantage to the public, first of all as medical officer to the Privy Council, and after to the Local Government Board. In 1870 came the appointment of a Royal Commission, and from the report of that Commission, they might date all the subsequent improvements which had occurred. Royal Commissions in this country are often the means of starting legislation which is likely to be not particularly popular. In 1872 and 1874 the whole of the recommendations of this Commission were carried into effect, the most important of them being the appointment of a sanitary authority in every sanitary area throughout the kingdom, these sanitary areas being, in rural districts, those under the control of the guardians of the poor. In 1875, being then President of the Local Government Board, he (Lord Basing) was enabled to pass through Parliament a great Consolidation Act, the Public Health Act of 1875, which not only put together the provisions of between 20 and 30 existing statutes, but established what he believed was the most complete code of sanitary law which existed in the civilised world. The metropolis had been exempted from this statute, and it was only this year that the whole of the improvements effected over the country generally in 1875 had been satisfactorily established within the metropolis.

Lord Basing then referred to the excellent hygienic work done by the Local Government Board. He pointed out that we have in substance, though not in form, a ministry of public health, and he did not advocate the appointment of a separate minister. There were no doubt some defects in the existing system. One of these was the need for re-settling sanitary areas. The administration of the public health law had resulted in the short period of 20 years in the reduction of the annual death-rate of this kingdom by about one-seventh. There were now 1,569 sanitary authorities, of which 575 were rural and 994 were urban. As regards the rural authorities, there had been appointed 529 medical officers of health and 528 inspectors of nuisances; in the case of urban authorities 691 had medical officers of health, and 625 had inspectors of nuisance under public surveillance and control.

He apologized for referring so extensively to English legislation and practice, but he hoped he had shown that in sanitary affairs England had not been behind in the race. Through the medical department of the Local Government Board much information had been collected digested, and disseminated for the information of the public. No doubt from the official expert point of view all that had been accomplished in the matter of public health was trifling in comparison with what should

be done. They would desire, no doubt, more inspectors, more reports, more public expenditure, more clear recognition, and a more definite title than they had at present to the functions they discharged, and to the minister under whom they worked. But Parliament and the public would not readily accept such conditions as these without some demur. They would ask for what purpose had local areas and local authorities been set up if it was not to render them self-reliant and independent in the discharge of their duties, and for what purpose had information been collected at head quarters and disseminated if not for the training and guidance of local administration. This consideration led him to the practical question, What should they do now in the way of improvement? Should they endeavour to centralise more than had been done hitherto, or should they be content to see the administration of public health decentralised and carried on from local centres? A statesman was apt to compromise on matters of this kind. His view was that they had gained a great success by adopting the existing system of local administration. He doubted very much whether it would be expedient or desirable to separate the one from the other. That might be an ideal to be aimed at, but he did not at the moment see a sufficiently popular basis upon which that separation could be effected or attempted. On the question of decentralising and losing in any way the control which the Local Government Board now exercised over the administration of the Public Health Act, upon that again his contention was that, however plausible the cry for decentralisation might be, it should never be carelessly taken up as applicable to all subjects indiscriminately. When it is necessary to apply similar conditions to every district, State control is absolutely necessary and should be universally applied. He referred to the poor law in England, which would never have been so well administered had it not been under central control. He was not in favour of decentralising in an unreasonable way, and, referring to the county councils which had been recently established in this country, he thought the time had not yet arrived when it would be expedient for those councils to take over the powers now vested in a highly trained central department of the State. It had been said that nothing good was ever done in a hurry. We have progressed with the small means at our disposal. Far be it from him, however, to say that any ardent reformer should ever be content with what had been accomplished, or that the State should ever hold the doctrine of finality in this respect.

Lord Basing next referred to the efforts of other nations for improving the public health, specially mentioning Germany, France, and Denmark, and paying a compliment to the scientific investigators in France. In conclusion he expressed the hope that the work of the Section would do much to throw light on the position which the State should occupy in regard to sanitation in highly civilised countries.

Dr. Dudfield (London) proposed and Dr. Littlejohn (Edinburgh) seconded a vote of thanks to the President for his address. The vote was carried by acclamation.

tion is not complete, or which are not beyond the initial stages of sanitary progress. The manifold experiences and judgments reported to that Commission by prominent medical officers, engineers, and administrators will continue to serve as a repertory, because they illustrate the great results already obtained, and bring to light the inconveniences and wrongs resulting from the want of obligatory legal procedure. The reports of the Commission * were put within the reach of Germans in 1874 by the meritorious work of "Finkelnburg." † I would mention a few of the principal points as far as they touch my present subject: (1) The greatest possible simplicity and uniformity in the sanitary law which should apply generally and without optional restraints; (2) Constitution of popularly elected sanitary authorities as organs of urban and rural self-government; establishment of local boards of health under sanitary state-superintendence; (3) Appointment, if possible, of at least one medical officer of health in every district.

Since then 20 years of experience and further improvements have passed, marked especially by the great Health Acts of 1875 and 1878. The following ideas relative to the organisation of local boards of health, are based on the institutions existing in England, though I suggest extension of powers both on the professional and executive side.

I. In order to introduce and adopt the uniform measures required in the interest of public health, and to subject them to a continuous control, especially for the purpose of paralysing the effects of infectious diseases, local boards of health should be established, to which, amongst other functions, should belong the hygiene of dwellings, notification of infectious diseases, and disinfection of infected articles.

Good results can be expected only in places where such boards are permanently established; in many countries, sanitary commissions are appointed only in case of need; such commissions will in most cases be too late, and it is impossible for them to maintain an exact continuous study of local conditions in execution of the maxim "*Si vis pacem para bellum.*"

II. These central local boards should be subject, if possible, to the local authorities of self-government, and should report to them, but under State control. If the poverty of any community prevents the establishment of a local board, Government should furnish a subvention.

III. The head of the local board should be a physician, if possible, giving his whole time to this work. To him the technical staff, both in the internal and external service, should be subordinated.

Without denying that medical persons alone are not sufficient to fulfil all the requirements of the public health, and admitting that they depend on the co-operation of auxiliaries, both chemical and physical, as well as statistical and administrative, I attribute great importance to the chief director being a medical man, not only to give the board a medical

* First Report of the Royal Sanitary Commission, 1869. Second Report, 1871.

† Finkelnburg: Die offentliche Gesundheitpflage Englands, Bonn, 1874.

Time does not permit me to enter upon all the last-mentioned points. I therefore limit my remarks to the compulsory removal of persons suffering from infectious diseases in cases of insufficient isolation. This will always be more or less a stumbling block, and will be dealt with differently in different countries according to popular enlightenment, and the temper and feeling of different peoples. While in Sweden, according to the law of 19th March, 1875, it is for the municipal commission of health to decide whether or not a person suffering from cholera asiatica, small-pox, scarlet fever, diphtheria, dysentery, abdominal typhus, or puerperal fever, shall be removed to a hospital; and while in Roumania an enactment is preparing by which the compulsory transport of sick persons suffering from the above stated diseases (besides measles, whooping cough, and canine madness) is absolutely prescribed for all cases that cannot be isolated in the dwellings, in Italy removal to hospital is not compulsory. "Our "citizens," says Professor Celli, "would not allow such a violation of "their individual liberty." England maintains a middle course. There, according to certain conditions, "any person who is suffering from any "dangerous infectious disorder, and is without proper lodging or "accommodation, or lodged in a room occupied by more than one "family, or is on board any ship or vessel," may, by order of the authority, be removed to a hospital.*

When this question is settled in the sense of my thesis, a mighty step will have been taken in opposing infectious diseases, and in strengthening the influence of local boards of health.

DISCUSSION.

Dr. Willoughby (London) agreed with Dr. Simon's proposal, that public health laws should be administered by experts. This was done in America, but in England boards of health were composed of persons often ignorant of health principles, and sometimes interested in offending against them. The difficulty of carrying out the Rivers Pollution Act in Lancashire, and of improving the dwellings of the poor, arose from this cause.

Sanitary Legislation in Ontario (Canada) for the Prevention of Epidemic, Endemic, Epizootic, and other Contagious Diseases.

BY

J. J. Cassidy, M.D., Toronto.

In this paper I shall first describe the provisions of the Ontario Health Act, by which the Provincial Board of Health of Ontario was established, together with the powers conferred on the board for the

* Sections 124, 125, Public Health Act, 1875.

public press, and by circular to the Local Boards of Health, municipal councils, and in and through the public schools, and otherwise as shall be deemed by them in the interest of the public health."

The powers of the Board were at that time of an advisory character. Unfortunately, however, this advisory feature had not proper scope, owing to the fact that very few municipalities had availed themselves of their powers to establish Local Boards. However, as a result of the investigations undertaken by committees of the Board into various epidemics in the province, owing also to the free circulation of sanitary literature, delivery of lectures, and publication of reports on health matters, together with the public interest excited by a sanitary convention held in London (Ontario), and more particularly by a persistent agitation in favour of the appointment of Local Boards by the councils, a considerable impetus was given to health work.

After two years' experience, however, it was felt that better local organisation was necessary. If executive work was to be carried on, it would be necessary to find a channel through which the provincial board could reach the people. The outcome of this thought was the Public Health Act of 1884, which makes it incumbent on all municipal councils to form Local Boards of Health each year immediately after the council themselves are elected, and by which all Boards possess the powers hitherto vested in the councils regarding health matters.

In four months after the passing of the Act, in the 447 townships of the province, 184 local boards were formed, 25 of these having medical health officers, and 19 of them sanitary inspectors, while 17 had appointed both medical health officers and sanitary inspectors. In the 203 cities, towns, and villages of Ontario, there were 180 local boards established, and of this number 63 had medical health officers, 92 had sanitary inspectors, and 44 had both medical health officers and sanitary inspectors.

Part Second of this Act, which deals with the powers and duties of Local Boards, is most important. When its provisions are properly carried out, local boards can, if composed of intelligent men, aided by a medical health officer and co-operated with by an appreciative council, grapple with contagious diseases in a most effective manner.

Provision is made by which the Local Board shall notify the owner of any premises requiring to be cleaned and disinfected; in case of non-compliance, a penalty is inflicted, and the work done by the local board at the expense of the owner. When the owner is poor or suffers from other disability, the expenses may be defrayed by the Local Board. Powers are given to local boards to establish hospitals, hospital tents, or places of reception for contagious diseases, and to provide carriages for the conveyance of persons suffering from such diseases to the hospital. Notice must be given to the Local Board of Health by householders in case of small-pox, scarlet fever, diphtheria, cholera, or typhoid fever, within twenty-four hours. Householders in whose dwellings any of the above-mentioned diseases occur shall not allow persons suffering from such diseases, or any clothing or other property to be removed without

the consent of the Local Board and medical health officer, or attending physician.

Physicians are obliged to report cases of the above-mentioned contagious diseases.

When any dangerous contagious disease breaks out in a municipality, the Local Board shall use all possible care to prevent the spreading of the contagion, and shall give notice of infected places.

Sick persons, or persons having access to them, are not allowed to mingle with the general public until permitted by the medical health officer.

If there is reason to suspect that any person has small-pox, diphtheria, scarlet fever, or other severe contagious disease in, or upon any steamboat, railway car, or other conveyance, the medical health officer, any member or officer of the Provincial Board of Health, or physician authorised by the Board, may cause the removal of such person and may detain the conveyance until it is disinfected.

Persons infected with contagious diseases, or who have been exposed to infection may be isolated.

Persons recovering from contagious diseases, and nurses who have been in attendance on them are not allowed to depart until their persons, clothing, and other property have been disinfected, and a certificate to that effect given by the medical health officer or attending physician.

The measures necessary for such disinfection, for the disinfection and disposal of excreta, for the disinfection of bedding, clothing, utensils, and other things, which have been exposed to infection are such as have been advised by the Provincial Board of Health, or the attending physician.

Notice is to be given to a person in charge of a conveyance by persons suffering from, or having very recently recovered from the above mentioned diseases. The owner of any such conveyance must not, after the entrance of any so infected person into his conveyance, allow any other person to enter it without having had it sufficiently disinfected. Precautions are also to be taken respecting the disinfection of bed clothing used by persons who have had contagious diseases. Local Boards may also provide a portable furnace for disinfecting purposes. They may also direct the destruction of any bedding, clothing, &c., and give compensation for the same.

Houses or rooms occupied by sick persons are to be disinfected before being let, and persons letting houses are not to make false statements respecting infectious diseases.

Penalties of from 5 to 50 dollars and costs may be imposed by the convicting magistrates or justices for violation of these enactments.

The Public Health Act of 1885 provided that whenever from the presence of any formidable contagious disease in any locality, the Provincial Board of Health considers the appointment of a medical health officer necessary in a municipality, and requests the council of the municipality to appoint one, the council shall forthwith appoint one. If a council does not appoint, the Lieutenant-Governor, upon the recom-

mendation of the Provincial Board, may appoint a medical health officer for such municipality. Provision is also made for compensation.

On account of the presence in any municipality of an epidemic or contagious disease, the municipal and school elections may be postponed.

Powers are also given for the purpose of disinfecting things or persons, entitling a Board or officer of a Board to employ force or obtain such assistance as is necessary. Section 3 of the Public Health Act of 1884 is amended, and full provision made for the inspection of railway stations, steamboats, and all public conveyances, their cleansing and disinfection, also for the detention of steamboats, railway cars, or anything contained thereon, or persons travelling thereby, and providing also for restraining the departure of persons and conveyances from infected localities, or the removal of persons living in infected localities, or for requiring the appointment of sanitary police.

The Public Health Amendment Act of 1886 provided for power to take possession of land or unoccupied buildings for hospital purposes, and also the proceedings to be taken whether the owner was a consenting party or not. In this year also, an Act was passed to amend the Act respecting vaccination. Provision is made in this Act by which a Local Board in case of neglect on the part of a council to provide for the vaccination of poor persons and others, may employ a physician to perform vaccination, and the council is obliged to pay for the same.

School trustees may also require certificates of vaccination from pupils. Students at high schools may also be required to produce certificates of vaccination.

In every municipality where small-pox exists or in which there is danger of its breaking out owing to the facility of communication with infected localities, the council may order vaccination and re-vaccination. Public notice is to be given by proclamation.

In 1887 an Act was passed providing that notification must be given by a householder to the school teacher of any school attended by children from his house, when a case of small-pox or other contagious disease appears in his house.

The Local Board are also obliged to give similar notice. The teacher is also obliged to notify the medical health officer on forms supplied by the school authorities, of any suspected case of contagious disease in the home of any pupil and he is required to prevent the attendance of such pupil until medical evidence of the falsity of the report has been obtained.

Local Boards have powers granted to regulate their ice supplies.

Remedies are also provided for tenants when Local Boards neglect to take action.

Provision is also made for the inspection of slaughter houses which are outside the municipality in which the meat is sold; also for the periodic inspection, by a veterinary surgeon, of all dairies, cheese-factories and creameries, dairy farms, and slaughter-houses, which come under the direction of a Local Board of Health.

In 1887 an Act was passed *re* school protection against infectious diseases, providing also for the regulation of ice supplies, for the in-

two last-named diseases as well as scarlet fever and diphtheria may be communicated by means of milk or other articles of food.

Under the head "Precautions to be taken by private individuals," the isolation of persons, especially children, who present suspicious symptoms, such as sore throat, discharges from the nose or eyes, bad breath, and fever, until the disease is diagnosed, is recommended.

Attention is drawn to the law of notification by householders and physicians.

The cleansing and disinfection of privy pits is enjoined. Mercuric chloride 1 in 500 is recommended. Whatever garbage is capable of being burned should be so treated, and all that cannot be so dealt with should be frequently removed. Care in the matter of water supply is enjoined. Frequent analysis is recommended. If filters be in use they should be cleansed and the filtering material renewed.

Supervision of the ice and milk supply are enjoined. Special regulations are made with regard to food in time of cholera. Special attention is also given to the matter of disinfecting stools in typhoid fever and cholera.

The proper trapping and ventilation of waste pipes and all connexions of house drains and flushing of sewers are also described. Rules are given by which people may avoid exposure to the poisons from the sick, from vehicles in which they may have been carried, the clothes they may have worn during sickness or convalesence, or the articles of table equipage they may have used.

The disinfection of bedding, clothing, mattresses, carpets, curtains, &c., is enjoined, and people are advised not to purchase such at second hand unless they have been properly disinfected.

Respecting the sick room, it should be preferably in an upper story if there is more than one storey. There should be an air-space of 1,000 cubic feet for each individual. Ventilation should be provided for, fireplaces or flues being used when practicable. Needless articles should be removed. Inexpensive bedding should be used and destroyed on the termination of the case; but if feather beds, feather pillows, &c., are used they should be subsequently disinfected with chlorine, sulphur, or intense heat. Disinfectants should be used in the bed-pan and the excreta buried, so as not to contaminate the water supply. In sewered towns they may be discharged into the sewers. Soiled clothing and bedding should be steeped for 24 hours in a tub containing a suitable disinfectant (1 in 2000 mercuric chloride), then boiled and rinsed in clear water. Clothing which has not been soiled may be treated by heat. The sweepings of the room should be burned.

Nurses and attendants in addition to keeping themselves and sick charges clean are advised to wear cotton or linen clothes or overalls. When convalescence has begun, the patient should after bathing and putting on clean clothes, be placed in a room distant from the sick room before joining the other members of the household. In no case of death from contagious disease should a public funeral be held; but the body should be buried without delay and as few persons as possible should

attend. In cases of deaths from small-pox, scarlet fever, diphtheria, and cholera, the body should be enveloped in a sheet thoroughly saturated with mercuric chloride 1 in 500, and the coffin should be filled up with sawdust, moistened with the same solution.

After the termination of the case, the room and its contents should be disinfected. When occupied, it should be washed with a solution of mercuric chloride 1 in 1000; when vacated it should be fumigated with sulphur for 12 hours, burning three pounds of sulphur for every 1,000 cubic feet of air space in the room; all surfaces should then be washed with the mercuric chloride solution, and afterwards with soap and hot water, finally doors and windows should be opened and the room ventilated freely.

The duties of municipal authorities are also described, but these have already been referred to under the various Public Health Acts of 1884, 1885, 1886.

The pamphlet concludes with a description of hospitals used in connexion with the Cantonal Hospital at Geneva, and adapted to the isolation and treatment of cholera, scarlet fever, small-pox, diphtheria, &c. This is an extract from a paper read by Dr. Jullard at the International Congress of Geneva, 1882.

Our present degree of organisation in health matters in Ontario is as follows:—

1. Provincial Board of Health, consisting of seven members, all physicians. The Board meets quarterly, and has certain powers which have been described in the first part of this paper. It has a chemical and bacteriological laboratory.
2. Five hundred and seventy-six local Boards.
3. Three hundred and fifty-six of these have medical health officers.

The following table shows the mortality in an urban population of 355,931 in Ontario for 1889 from small-pox, scarlet fever, measles, diphtheria, typhoid fever, and phthisis:—

Small-pox	No deaths.
Scarlet fever	27
Measles	16
Typhoid fever	148
Diphtheria	207
Phthisis	678

Our Board is at present engaged in preparing a pamphlet, setting forth the best means of preventing the dissemination of phthisis among the people.

The Vaccination Act provides for compulsory vaccination of infants, but in practice it is not enforced, except in times of epidemic. The percentage of unvaccinated persons is however small. A vaccine farm is in operation at Palmerston, subject to the inspection of the Provincial Board. A constant supply of good bovine lymph can always be obtained from this establishment. Most vaccinations are done with bovine lymph, the humanised article being but little used. Opposition to vaccination is confined to a few, and those of but little influence.

DISCUSSION.

Dr. Covernton (Canada) urged the necessity of having stringent regulations in dealing with infectious diseases. During the small-pox epidemic of 1885 in Montreal (Province of Quebec) hundreds of deaths occurred daily. The Montreal Local Board of Health then only possessed advisory powers. The Government of the Province of Ontario sent a delegate to Montreal to ascertain the measures taken. He, with delegates from three bordering American States, met the Montreal board, and learnt that they had used their limited powers well, but that these did not enable them to effectually cope with the disease. After consultation with the delegates, the Montreal board obtained full executive powers from the Government, and beneficial results quickly followed. In the interval seven Toronto medical men were sent to Montreal. One remained there to watch every package of goods leaving for Ontario, and to ascertain whether it had come from an infected locality; one travelled on every train from Montreal to Ontario and offered re-vaccination to every passenger who had not been vaccinated for seven years; those who refused were prevented from entering Ontario. There are now in the Province of Quebec numerous medical health officers, and existing regulations in that province are as stringent as those in Ontario or in the American States.

Dr. Craik (Canada) said that prior to 1885 nothing was known of public hygiene in the Province of Quebec. The good work done by the Central Board during the small-pox epidemic of that year resulted in the establishment in 1887 of the present provincial board. Since 1887, 314 local boards had been organised in the most important towns of the province. The public appreciate the work of the provincial board. Under a recent statute, regulations had been issued that would bring the sanitary law of the province up to a high level of perfection.

Dr. Prince (Boston, U.S.A.) stated that in Massachusetts the system of health boards was essentially the same as in Ontario. Some years ago the Boston board decided to quarantine or remove to hospital every case of small-pox. This, and other measures, practically stamped out small-pox from the city. About a year ago that board decided to take similar steps in regard to scarlet fever and diphtheria. Difficulty had arisen from the want of sufficiently early notification, and from lack of facilities for caring for the sound members of the family where the persons are poor. To properly quarantine the sick a hospital was wanted that would take both sick and healthy. Thus, if a child were ill, the mother should be received, and sometimes her other children also.

Dr. Whitaker (Belfast) referred to the difficulty of disinfecting houses where infectious disease had appeared, and in which persons still lived. Harm might be done to the latter by indiscriminate or excessive use of disinfectants. He also referred to the difficulty of procuring the removal of better class patients to hospital. Belfast had no system of notification, and no special hospital for infectious diseases. Cases had, however, been successfully treated in the workhouse hospital.

Councillor Coe (Halifax) desired that school authorities and teachers should be compelled to notify to sanitary authorities the existence of disease at the homes of children, as in America. Very much depended on promptitude of notification and efficiency of isolation.

Councillor Biggs (Leicester) deprecated the tendency to ask for more compulsory powers. Although Leicester had not, like Toronto,

enforced vaccination regulations, no deaths from small-pox had occurred in Leicester during the last eight years, although cases had often been imported. Extreme measures like those in force in Canada would be resisted here, though all classes were willing to submit to well considered regulations which did not trench on personal liberty. In Leicester, people had voluntarily gone into quarantine, and enabled the sanitary authority to stamp out small-pox without vaccination by applying sanitary measures and isolation.

Dr. Cassidy (Canada), in reply to questions, said that physicians in Ontario were not required by law to disinfect themselves; that under the Ontario Public Health Act infectious disease must be notified within 24 hours; and that according to the medical opinion of the age safety against small-pox depended on vaccination, isolation, and disinfection.

Results of Ten Years' Public Sanitary Work in Dublin.

BY

SIR CHARLES A. CAMERON,
Ex-President and Professor of Hygiene and Chemistry, R.C.S.I.,
President of the British Public Health Medical Society,
Superintendent Medical and Executive Officer
of Health, and Public Analyst for Dublin,
&c., &c.

The population of the Dublin registration area amounted, according to the census of April, 1891, to 357,050 (unrevised figures), and of the city or central portions to 254,709. The population in the whole area was at the rate of 14·8 persons per acre, and in the city 66·2. The birth-rate is about 29 per 1,000 of the population. The mean temperature at the Ordnance Survey Office, Phœnix Park, for the 10 years ended in 1890 was 48·3; it is slightly greater in the city. The population of Dublin city increased 2 per cent. between 1881 and 1891, whilst in the whole area the increase was 3·5 per cent. In the Dublin Metropolitan Police District—population in 1891, 369,891—the males numbered 169,203, and the females, 192,688.

Dublin is situated on both sides of the river Liffey, and its suburbs spread round the Bay of Dublin. It is well supplied with main sewers, the contents of which are discharged into the river. A large portion of the city lies so low that the floors of basement stories are below high-water level, consequently, the sewers cannot continuously discharge their contents into the river. The mouths of the sewers are provided with valves which open outwards, and which are closed when the water in the river rises to the level of the sewer mouth. The sewers situated near the mouth of the river are often sealed during the greater part of the twenty-four hours. In order to prevent their contents from becoming impounded to such an extent as to prevent the drainage from the houses entering the sewers, powerful steam pumps are employed to

lift the surplus sewage to a level above high-water. It will therefore be seen that Dublin is unfavourably placed with respect to its sewage, which is retained for a long time in the sewers, and which, when discharged into the river, constitutes a nuisance therein, which, especially in warm weather, is greatly complained of. At the present time the Municipal Council is seriously considering the question of main drainage. At no distant date we may expect to see the Dublin sewage either conveyed to a distant point and discharged into the open sea, or subjected to some precipitation process; on economic grounds, I prefer the latter method.

Another disadvantage under which Dublin suffers is the decayed condition of a large proportion of the tenement houses. There are about 54,000 families in Dublin, inhabiting about 24,000 houses; 32,000 families occupy 8,000 houses, and 22,000, the remaining houses. The 32,000 families have $1\frac{1}{2}$ rooms on the average per family. The tenement houses were for the most part originally built each for a single family, and many of them now accommodate from 4 to 10 families. These houses, it need hardly be said, are ill adapted for the accommodation of several families, and many of them are so old that it is almost impossible to keep them in proper repair.

Late in 1879, I became the chief Medical Officer of Health for Dublin, and soon after the whole Sanitary Department of the Municipality was placed in my charge; I was appointed the "Executive," as well as the "Medical," Officer of Health, and the power of appointing and dismissing the sanitary officers was given to me.

In 1879, the death-rate in the Dublin metropolitan area (city and suburbs), was 35·7 per 1,000 persons living; and in 1880, it was 35·9 per 1,000. In 1879, the death-rate in the city of Dublin was 37·5; and in 1880 it was 37·8 per 1,000. In 1879 the death-rate caused by the principal zymotic diseases was 5·6 per 1,000 persons living in the whole metropolitan area, and 6·2 in the city. In 1880 the rate was 7·2 in the whole area, and 7·9 in the city.

This was the terrible state of things existing in Dublin when I became the chief health officer. The measures which I proposed should be taken to improve the sanitary state of Dublin, were chiefly as follows:—1. To provide better dwellings for the very poorest classes of the community. 2. To de-tenant and close the tenement houses which were most unfit for human habitation. 3. To compel the owners of tenement houses to keep them in tenantable order. 4. To cleanse daily by Corporation workmen, the yards of the tenement houses and their sanitary accommodation. 5. To abolish the privies and ashpits in connexion with houses, tenement or private, and to substitute therefor water-closets and portable ash-bins.

I shall now briefly state how far my suggestions have been acted upon, and the results.

1. The Corporation of Dublin, on consideration of my report recommending the adoption of the provisions of the Labouring Classes' Dwellings Acts, resolved in 1881 to accede to my request. In 1888,

two blocks of artisans' dwellings and a nightly lodging-house were erected by the Corporation on a portion of their own estate situated in Barrack-street; they comprise 144 separate dwellings and 100 beds for nightly lodgers. The dwellings are rented from 1*s.* 6*d.* to 5*s.* per week. There are five shops which bring higher rents. This scheme cost 27,500*l.*; it has not been successful from a pecuniary point of view. In 1890, two-story houses were erected in Bow Lane on a site owned by the Corporation; they comprise 86 self-contained dwellings. Each house contains four distinct tenements: two upon the ground floor and two upon the first floor. The dwellings are built side by side in a continuous row, on each side of a new street, running north and south, thus giving the dwellings east and west aspects. Each tenement consists of a living room 12′ 8″ × 12′ 0″; one bedroom, 10′ 6″ × 7′ 6″; also a convenient sized scullery and a separate water-closet, all 8′ 3″ high. The weekly rent of this tenement on the upper floor is 2*s.* One of the two tenements on the upper floor contains a bed recess over the bottom flight of stairs, affording accommodation for two children or one adult, in addition to the bedroom accommodation. For this tenement 2*s.* 6*d.* is charged. On the ground floor the tenements are similar, but possess large gardens. The rent for the tenement on the ground floor, without the bed recess, but including garden (which is much appreciated), is 3*s.*, and for the tenement containing the bed recess under the upper flight of stairs, 3*s.* 6*d.* It will be observed that the arrangement of the tenements is such, that in the event of the family including grown-up children, two tenements, possessing very ample accommodation and conveniences, with separate water-closets, &c., for the sexes, can be obtained at the rent of 4*s.* 6*d.* for the two upper tenements; or that one ground floor tenement with garden, and one first floor tenement can be obtained for 5*s.* A complete and perfect system of ventilation is provided by means of upcast and downcast flues to each room, the inlets and outlets of which are so placed as to prevent draughts, and a constant change of air is ensured, although the doors and windows may be closed. The living room is provided with a cottage range and an enclosed cupboard, and the scullery has an earthenware sink supplied with cold water, also a coal-box adjoining the sink, and a meat-safe over the window; the latter being in three heights; the upper portion of the window and side panels of the safe are filled in with perforated zinc. The windows of the living rooms are 4 ft. wide, and extend up to the ceiling, thus causing the rooms to be both light and cheerful. The windows of bedrooms and of the scullery are also carried up to the ceiling. The buildings are all of concrete and are fire-proof throughout, the upper floors being also constructed of concrete on iron joists. The roof is flat, similarly constructed, and covered with two thicknesses of asphalte; and the whole area under the rooms on the ground floor is covered with broken stones, concrete, and a layer of pitch and tar, ½ in. thick, to ensure absolute dryness. The landings and staircases are of concrete, covered with asphalte, and the floors of sculleries and water-closets are of concrete. The whole scheme consists of 86 of these self-contained dwellings, some of them with

shops, and others with additional rooms, for which an increased rent is charged according to accommodation. Applications largely in excess of the number of tenements to be let were received before the dwellings were completed. Every tenement is occupied, and no rent is in arrear, or has been lost since the dwellings were opened, and a large number of applicants are now on the books seeking vacancies as they occur. The dwellings were erected for the accommodation of labourers, but widows and single women (seamstresses and others) are also received as tenants. Mr. Dudgeon was the architect, and consulted with me as to details of the dwellings. The Dublin Artisans' Dwellings Company have provided healthy dwellings for nearly 10,000 persons, and about 1,000 persons are provided for by the City and Suburban Workman's Dwellings Company. Messrs. Guinness, Sons & Co., brewers, have provided dwellings for a large number of their workmen, and so have some other employers of labour. Altogether good dwellings have been lately erected capable of accommodating about 15,000 persons. It would, however, be desirable to provide improved dwellings for at least 50,000 persons.

2. From 31st August, 1879, up to 31st December, 1890, 2,556 insanitary houses have been detenanted and closed. More than one-half have been completely removed, and the others have been extensively repaired and rendered habitable. The houses that have been completely taken down have in a large number of cases not been replaced by new ones, as they were situated in close alleys and courts, or in other situations in which it was undesirable to build houses. Seven hundred and fifty-eight cellar and kitchen dwellings have been closed since 1879, as have also several hundred rooms in houses, portions of which were fit for occupation. In one district—Wood Street, Arthur's Lane, and Oliver's Alley—an area of more than one acre was cleared without any expense to the city in the way of compensation to the owners of the houses. All the houses were detenanted under the provisions of the Public Health Acts (Ireland), 1874 and 1878, and when they became ruinous, they were pulled down. Clearances of a similar kind have been made in Bull Lane, Kennedy's and Ross Lanes, and in other localities. In addition to the above-described clearances, two unhealthy sites were cleared under Cross's Act. They embraced an area of 7 acres 3 roods and 13 perches, upon which some of the most insanitary dwellings in Dublin were situated. The cost amounted to 51,500*l.*, or at the rate of 5,971*l.* per acre. The houses cleared away numbered 361, and were inhabited by 2,603 persons. The cleared sites were let by the Corporation to the Artisans' Dwellings Company, at the rent of 390*l.* per annum, and they are now covered with Artisans' and Labourers' Dwellings. Some very unhealthy dwellings were got rid of at my suggestion by making a new street (St. Augustine Street), at a cost of 8,000*l.* Very bad dwellings were also got rid of within the last 10 years by making two new streets (Lord Edward Street and Tara Street), but these improvements were not undertaken at my suggestion. The money expended in clearing the Coombe and Plunkett Street areas, and providing dwellings for the working classes amounted to 92,025*l.*

3. A vigorous inspection of tenement houses has been maintained since 1879, with the result that their condition has been materially improved. In the inspectorial work, 23 officers are employed under my directions.

4. In Dublin, the ashpits and privies of private houses are cleansed by the Corporation. Finding that it was very difficult, and indeed impossible, to get the owners of the tenement houses to keep the yards, privies, and water-closets clean, I induced the Corporation to undertake this duty. It is now carried out at an annual cost of about 3,000*l.* This system has been, I believe, an important factor in improving the health of Dublin.

5. Before 1880, water-closets were unknown in the tenement houses; some of them had no sanitary accommodation at all, whilst in many cases the privies were placed against the back walls of the houses, and they communicated directly with the large and uncovered ashpits. The contents of the latter were, especially in wet weather, more or less liquid. The proximity of these ill-kept and rarely cleansed privies and ashpits to the tenement houses produced, I am satisfied, great injury to health. I commenced at once an attack upon the privies, and in 1880, 743 waterclosets were substituted for them, nearly all in tenement houses. In 1881,* 603 waterclosets were substituted for privies. In 1882 I had a survey made, which showed that in all Dublin (City) there were 15,531 waterclosets and 11,269 privies. About this time I reported strongly in favour of providing portable bins for the reception of house refuse, and since then every effort has been made to abolish the built ashpits and to substitute for them portable bins. At the close of 1890 there were 10,752 Corporation dustbins in use. Very few privies now remain, and in Dublin the water-carriage system of excreta has almost completely been established. Amongst the sanitary measures taken for improving the health of Dublin, I may mention the thorough and gratuitous disinfection of infected dwellings, clothes, and bedding. Infected beds are burned, and new ones given gratuitously in lieu of them. Disinfectants are given free to the working classes. A laundry for infected linen has been established; public baths and wash-houses have been provided in Tara Street; a public abattoir has been established, which, however, has not as yet been largely used; the inspection of dairies and cow-sheds is carried out by four inspectors; the Act for the compulsory notification of infective diseases has been adopted. Within the last 10 years 54,000*l.* has been expended in providing new sewers and machinery for pumping out their surplus sewage. Two open spaces for recreation have been provided by the Corporation at a cost of more than 2,000*l.*; and contributions amounting to 104*l.* a year are made towards maintaining two open spaces which are not directly under the control of the Corporation. If we regard the improved paving of the streets as a measure likely to promote public health, then the money expended in that work (225,706*l.*), in new sewers

* In 1884, 2,789 waterclosets were substituted for privies as a result of proceedings by the sanitary staff.

(53,107*l.*), and in carrying out the improvements above referred to and some minor ones, amounts to 607,603*l.* 1*s.* 7*d.* This large sum has been obtained as "sanitary loans" since 1880. There is still much to be done before the city can be regarded as incapable of further improvement by Corporation action. The private slaughter-houses should be abolished. Dairy-yards should be got rid of. Every remaining privy and built ashpit should be wiped out. A main drainage system should be carried out. At least 7,000 more dwellings should be provided for the working classes.

Now, let us see whether or not the expenditure of 607,000*l.*, and of 10 years' sanitary labour, have resulted in any substantial improvement of the public health in Dublin. It is well known that sanitary reforms do not generally bear immediate fruit. It is, therefore, only towards the close of the decennial period of sanitary work in Dublin that we might expect to find a diminution in the enormous death-rate of Dublin. The average death-rate in the Dublin metropolitan area during the period 1876–80 was 31·76 per 1,000 persons living. In the city the rate was 34·11 per 1,000, and in the suburbs, 23·39. During the period 1881–85, the death-rate in the whole registration area was 27·32, in the city 30·34, and in the suburbs 19·68. In the period 1886-90, the death-rate in the whole area was 26·3, in the city 28·86, and in the suburbs 19·86. In the period 1876–80, the death-rate from the principal zymotic diseases in the whole registration area was 5·29 per 1,000 persons living; the rate in the city being 5·83, and in the suburbs 3·27. In the next quinquennial period, 1881–86, the rate in the whole area was 3·06, in the city 3·42, and in the suburbs 2·16. During the period 1886–90, the rate in the whole area was 2·86, in the city 3·2, and in the suburbs 2·02. Before the year 1879, 10 per cent. of the deaths were unregistered. In that year, owing to recent legislation, perfect registration first commenced, and the burials no longer exceeded by 10 per cent. the registered deaths, as was the case until early in 1879. I have, therefore, added 10 per cent. to the recorded death-rate for 1876–77–78. The causes of a high death-rate in communities may be nearly altogether capable of removal by the sanitary authority, or they may only to a moderate extent be of such a nature as to admit of removal by the sanitary authority. Poverty and intemperance are two potent factors in causing a high death-rate, and they are hardly under any control by the local authorities. The proportion of very poor persons in Dublin seem to me to be somewhat greater than in most of the English cities—certainly greater than in London. In all cities, it is undoubtedly the case that there is a greater mortality amongst the poor than amongst the middle and upper classes. It is not in the power of the Corporation of Dublin to provide employment and good wages for the masses of the population, and consequently constitutional and other diseases as affecting the poorer classes, are beyond Corporation influence. The effects of public hygiene are, however, felt in respect to zymotic diseases by all classes. I think I shall show that the 10 years' sanitary work in Dublin has apparently greatly reduced the zymotic death-rate, though it may not have very largely lowered the general death-rate. The general death-rate declined

in the period 1881–85, as compared with the previous quinquennial period, to the extent of 13·98 per cent. in whole area, 11·05 per cent. in the city, and 15·86 per cent. in the suburbs. In the following five years the death-rate decreased 3·73 per cent. in the whole area, 4·88 per cent. in the city, and increased 0·91 per cent. in the suburbs. The death-rate from the principal zymotic diseases decreased during the period 1881–85, as compared with the previous five years, 42·16 per cent. in the whole area, 41·34 per cent. in the city, and 33·39 per cent. in the suburbs. In the following five years the decrease was 6·44 per cent. in the whole area, 6·43 per cent. in the city, and 6·48 per cent. in the suburbs. As compared with 1876–80, the death-rate decreased in 1881–90, 15·59 per cent. in the whole area, 13·22 per cent. in the city, and 15·48 per cent. in the suburbs; and the zymotic death-rate decreased 44·05 per cent. in the whole area, 42·23 per cent. in the city, and 36·09 per cent. in the suburbs. The relation between the decrease in the mortality of the whole area, and that of the city and suburbs in 1880–85 is affected by the circumstance that, in 1881, four large and almost wholly rural districts were added to the Dublin Metropolitan Registration area. In the new districts the general and zymotic death-rates have been, and are still, lower than in the four suburbs which always formed part of the Dublin Metropolitan Registration area. The improvement of the public health in the city of Dublin has a good effect upon that of the suburbs, as a large proportion of the inhabitants of the suburbs are engaged in business in the city all day, and are subject to a large extent to whatever insanitary influences there may be in operation in the city. In 1891 the improvement in the state of the public health of Dublin continues. During the first 30 weeks of the year the death-rate was 2·8 per 1,000 persons living under the mean rate for the corresponding period in the previous 10 years. The most remarkable feature in this year's mortality statistics is the close approximation of the zymotic death-rate in city and suburbs; indeed, in the first quarter of the year the zymotic death-rate was only 1 per 1,000 in the city, whilst it was 1·2 per 1,000 in the suburbs. With respect to the particular zymotic diseases, which have declined in Dublin within recent years, special reference must be made to typhus fever. This disease formerly caused terrible ravages in Dublin, but lately it has almost completely disappeared. On the other hand, typhoid fever has not decreased at all. Very few cases of diphtheria occur in Dublin. In 1890, the deaths in the city of Dublin per 10,000 persons attributed to typhoid fever were 49; to typhus fever, ·07; to diarrhœa and dysentery, 59; to whooping cough, 59; to scarlet fever, 2; to measles, 26; to diphtheria, 0·9. Small-pox has long been extinct in Dublin. A few years ago, Dublin had a much higher death-rate than any of the large English towns; lately, several English towns exceed it in mortality. With respect to its zymotic death-rate, Dublin now compares very favourably with the English towns. In conclusion, I may state that the population of Dublin has been slightly under-estimated since 1881, hence its death-rate has been slightly exaggerated; on the other hand, the population of the English towns has been (on the whole), enormously

over-estimated, and, consequently, their death-rate under-stated. For example, if we correct the death-rates of Liverpool, Manchester, and Bolton for the period 1881–90, by the results of the census of 1891, the rates will be—Liverpool, 26·3 per 1,000; Manchester, 26·6; and Bolton, 26·5. In the period 1886–90, the mean annual death-rate in Dublin was 26·3.

DISCUSSION.

Dr. T. W. Grimshaw (Registrar-General for Ireland) estimated from the Irish Census Returns that in 1871 about 100,000 out of the 250,000 inhabitants of Dublin lived in tenement houses unfit for habitation. This was a great difficulty to overcome. When he became physician to Cork Street Fever Hospital in 1861 a large number of the beds were always occupied; but for a long time past the average number has been very low. The money expended by the Dublin Corporation for clearing unhealthy sites is not all lost; increased municipal rates are received from houses of higher value built on the sites, poor rates have diminished, and sanitary rates are lower. The Corporation have liberally aided the work of Sir C. Cameron, and from Dublin many valuable sanitary lessons can be learned.

Dr. Whitaker (Belfast) objected to corporations undertaking house-building; their duty should be limited to strict supervision. He approved of their providing for back-yard cleansing; thought that the Dublin sewage should not flow into the river Liffey, and spoke of the advantages arising from "provisional orders" as a means of conferring on corporations powers to carry out improvements.

Sir John Banks (Dublin) said that the improved sanitary condition of Dublin was shown by the diminution of typhus fever, which formerly there found a home, but was now rarely seen. He referred the improvement to the work of Sir C. Cameron.

Sir C. Cameron, in his reply, stated that the demolition of houses in Dublin was mostly effected under the Public Health Act, in which case the sanitary authority incurred no cost. He thought the municipality should not erect houses for the better class of citizens, but they might usefully do so for the very poor.

Should the State undertake Scientific Investigations into the Origin and Causes of Disease.

BY

Hy. Tomkins, M.D., B.Sc., Medical Officer of Health for Leicester.

Everyone engaged in public health work must have often felt the limitation of our knowledge in regard to the causes, etiology, and favouring circumstances connected with the prevalence of certain diseases, and our professional brethren who are more concerned in the treatment and cure of disease must feel still more the need of expert

training to deal with problems which often demand constant prolonged scientific study, observation, and experiments.

The desirability of the State undertaking many of the investigations into the causation of disease first impressed itself prominently upon my mind during some efforts of my own to trace to its origin and cause the undue annual mortality from diarrhœa at Leicester. In many instances it is simply impossible for any unaided private individual to obtain all the detailed information, extending often over the length and breadth of the land, connected with obscure problems of disease causation, or to compare, accurately and scientifically, conditions existing in one district with those in another or others, though they may be of the utmost importance to enable us to arrive at any approximately accurate conclusions.

The need for State help in such inquiries has practically been admitted by the Government in the establishment of a medical department at the Local Government Board, not the least important of whose functions has of late years been the investigation of outbreaks of epidemic disease. These investigations, all bearing upon the causation and prevention of diseases, not necessarily infectious, have been carried on by skilled experts, physicians, chemists, bacteriologists, physiologists, and others, chosen for their special knowledge in some particular branch of science, many of them not being members of the permanent medical staff of the department.

Amongst these may be cited—

Work carried on by Dr. Klein in connexion with tuberculous disease in its various phases; diphtheria; etiology of croupous pneumonia; scarlet fever, &c.

Dr. Burdon Sanderson on disinfection, &c.; Dr. Cash on disinfection and on ptomaines found in secretions and excretions of the body; Mr. Law's work connected with disinfectants. Life conditions of anthrax bacillus, &c.

Dr. Du Pré :—Changes in aëration of water.

Dr. Woolridge :—Mode of action of pathogenic organisms.

Dr. Longstaff :—Diphtheria.

The work, too, of members of the permanent staff is often of a strictly scientific character, such as the investigations carried on by Dr. Ballard into causes of diarrhœa;

By Dr. Parsons, upon best methods of disinfection;

By Mr. Power upon disease in cows, and scarlet fever; together with much other of a like nature.

Good work has already been done, but much more remains to be accomplished; the field is immense; to mention only a few of those diseases which at the present time call for special inquiry into their causes, their mode of origin, and the conditions favourable for their production, we may cite—

(1.) Cancer in its different forms, with its marked increase of late years, and its apparent special incidence upon certain districts and localities.

(2.) Diphtheria, with its increased prevalence during the past decade amongst many of our large urban populations. Formerly this disease was most prevalent and fatal in the rural districts of the country; why the change? Never before was sanitation (speaking generally) carried on more rigorously, at all events in our large towns, and yet it is here that this disease appears to be making most headway. It is impossible, in the inquiries necessary to be undertaken in connexion with investigations into either of these diseases, for any single and isolated observer to do more than touch the fringe of the subject.

(3.) The causes and etiology of diarrhœa, producing annually an enormous mortality, are still largely matter of speculation. Dr. Ballard in his elaborate report published in 1889, the result of some years study of the subject, says that his conclusions are to be taken only "as a working "hypothesis or provisional explanation that would best accord with the "production of epidemic diarrhœa." I myself have worked at this subject pretty exhaustively, and probably from a bacteriological standpoint as fully as any observer up to the present time, but my observations have been confined to Leicester, and I feel the need for a more extensive investigation carried on in the same way in other places, both where the disease prevails and where it is comparatively absent.

(4.) The etiology and transmission of tuberculosis, especially its connexion or otherwise with the same disease in the lower animals, is a subject worthy the assistance of all governments. Much has been, and is being done, by private enterprise and by State aid in other countries; our own government should help. The importance of it has been recognized by the appointment of a Royal Commission to inquire how far our knowledge in this direction extends.

(5.) Investigation into the causes and origin of epidemic pneumonia, an outbreak of which at Middlesboro' was the subject of inquiry by one of the staff of the Local Government Board.

(6.) The study of the recent outbreak of influenza (if the now familiar neurotic-febrile disease be thus rightly termed), which has also been the subject of inquiry and report by another member of the same staff. These and many other diseases and conditions which conduce to disease are worthy of State help in their investigation.

Look at the enormous ground covered by the practical study of bacteriology and its intimate relation with so many of the processes of health as well as disease. Thanks to the efforts of private individuals considerable progress has been made in this branch of study, but it is often in the face of much difficulty, and in no case is work of this kind remunerative from a pecuniary standpoint. The knowledge required of those who undertake such work is of a special and varied character, and at present the number of men properly qualified or capable of carrying it on is not large—the more reason why the State should come forward with assistance. A few semi-public bodies have at times contributed by grants or special contributions to help forward scientific work in connexion with disease, *e.g.*, the Grocer's Company and the British Medical Association. But I submit that the government of a country is the proper source from which material assistance should be forth-

coming for the furtherance of work having for its sole object] benefits to the health of the community at large. By a private individual, however able, dependent upon his own exertions for his maintenance, work of this character cannot be followed as a life's occupation, and many men very capable of doing good service are prevented by lack of means. The State should, therefore, provide adequate emoluments and encouragement to men willing to devote themselves to this work.

England compares unfavourably in this respect with some continental countries.

Our Government does not hesitate to maintain at considerable cost chemists and other scientific men to devote their whole time to work which has for its ultimate object the improvement of the art of killing and slaying, and provides splendidly equipped laboratories at Woolwich for experimental studies connected with war, whilst on the other hand it is most niggardly in its dealing with matters which are vitally connected with the health and well-being of every member of the community.

I shall not now attempt to deal with the ways and means by which these proposals might be carried out. An ideal arrangement would be the establishment of a Government Department, with a Minister of Public Health at its head, but in default of this surely something might be easily gained by extending the work done by the Local Government Board. Briefly, the medical department of that Board should be empowered to do thoroughly and systematically that which it now does incompletely and in a somewhat hap-hazard manner.

Should the State undertake the Support of Laboratories for the Investigation of Disease ?

BY

A. E. Wright, B.A. Cantab., M.D. Dublin.

Political aspect of the matter depends upon which of the following alternative standpoints is adopted :—

(*a*.) The State shall undertake every function that can be advantageously undertaken by it.

(*b*.) The State shall undertake only such functions as it cannot without detriment to itself refuse to undertake.

It is proposed to discuss the matter from this last standpoint, because it is the more generally accepted one, and also because the concession of the necessity of the State undertaking the support of research laboratories from this political standpoint will involve the concession of the same thing *à fortiori*, from the standpoint which involves a wider interpretation of the functions of government.

Now, it may be urged in favour of the State undertaking the support of laboratories for the investigation of disease, that this is

really not a new function which the State is asked to assume, but rather the more complete discharge of a function which every civilised government has long since felt it its duty to discharge. The administration of sanitary regulations by the Government, the institution of national vaccination, including the supply of pure calf vaccine for the purpose, and the investigation into the causes of outbreaks of epidemics under the Local Government Board, the compulsory notification of infectious disease, and the universal registration of the cause of death, are instances of many-sided functions already undertaken in England by the State in connexion with the study of disease with a view to its prevention. The endowment of permanent laboratories for the study of the general causes of disease would only be a completion of the policy inaugurated by the Local Government Board in making particular grants for the investigation of particular facts in the ætiology of disease.

It is evident, however, that the system, as we have got it in England, is unsatisfactory, inasmuch as it is incomplete. The scientific men to whom the grants are made are considerably hampered in their work by the lack of appliances, such as a well-equipped State laboratory would afford; and the uncertainty of permanent employment, and the expenses of the work of research which may come to be borne by the investigators out of their own funds make the profession of scientific research one which it is only possible to pursue in England under conditions of financial risk. Further, the absence of well-equipped and well-officered laboratories at home compels the young Englishman to go abroad for the purpose of obtaining his scientific training.

To one, indeed, who has frequented the foreign schools of higher learning, the consciousness comes home very vividly of the condition of parasitic existence—in all matters at least relating to medical research—in which England is living. We do not do our share among the nations in the sphere of scientific medical research, though through the genius and self-sacrifice of individual workers we have not entirely dropped out of the race.

Though, as has been stated, something at least of what individuals can do has been done, what the nation as a nation ought to do has been left utterly undone; and yet it must be the unconscious will of the nation, the unconscious will of which a real statesman would feel himself to be the interpreter, to do our share in every work, like that of medical research, which will ultimately renovate the world.

Our Australian Colonies, who have had the question of the relation of the State to the endowment of medical research before them in many ways, have decided the question, as I understand it, in favour of undertaking that function.

In one of its aspects the subject is closely interlinked with the question of university medical education, and with that of the building and equipment of laboratories in connexion therewith. With reference to this I may, perhaps, say that the Government of New South Wales has built and equipped in Sydney a series of laboratories and a hospital in connexion with the medical school of the university in a style of

dignity and completeness with which one is q
and which reminds one of the full equip
universities. In the Universities of Adelai
evident that the Governments of the sister Col
view of the functions of the Government in re
I have, however, here touched upon a subject
that proposed for discussion, inasmuch as it in
of the endowment of higher education.

The Governments of the Australian
brought into relation with the question that
paper in other ways; notably by the existence
the possibility of a remedy for it being di
bacteriological research. Attention has also b
by the occurrence of leprosy in the Colonies, a
some steps to prevent its increase.

It may, however, be remarked that th
urgent in the Colonies than it is at home, beca
differing from those obtaining in Europe, natu
series of problems which require investigation

The remoteness from Europe, and the u
reliable information through ordinary channel
this direction. It, for instance, determined
three southern Colonies to depute in each case
the medical staff of the universities to proc
order to report upon Koch's method of treatin

It may, however, be rejoined that the c
countries like the Colonies is totally different t
as it would there be a question of the neces
objects either coming from the State or not c
England the object could be attained by the combination of individuals.
It might further be urged in support of this view that we have in England laboratories which owe their establishment and support to semi-public corporations like the Universities and the conjoint Colleges of Surgeons and Physicians in London and the College of Physicians in Edinburgh, and to testamentary dispositions like that to the Brown Institution.

It might also be rejoined that there are now available at home in all a good number of research scholarships granted by the munificence of such corporations, for instance, as the Worshipful Company of Grocers, and that these make any State endowment of medical research unnecessary.

The following answers may, however, be made to these objections:—

(*a*.) The beneficence of individuals should not be taxed for the common good of all.

(*b*.) In Australia the State has undertaken these duties in face of such a munificent grant as that of the Challis bequest (over 2,500,000*l*.) made to the University of Sydney.

(*c.*) The laboratories at present existing in England are insufficient, and their equipment inadequate, owing to a great paucity of funds.

(*d.*) The research scholarships, though invaluable as endowments for a certain number of workers, do not constitute a provision for laboratories, nor for the development in England of higher schools of research, the absence of which hampers the progress of medical research both in England and in her Colonies, whose students would naturally be drawn to research in larger numbers if this means of education were provided in England.

Finally, the whole question of medical research is complicated with the question of vivisection. The unconscious, or at any rate, the silent will of the people may be assumed to be in favour of vivisection constituted as it is at present, *i.e.*, vivisection limited only by the necessary restraints upon inhumanity; on the other hand, the will of a small minority, which is the only will that makes itself audible upon the matter is against vivisection in any form.

The will of this minority, however, deserves some attention, because it is the will of a not entirely negligeable fraction of the population, to the majority of whom the movement recommends itself as from an *à priori* point of view a humane movement. In a minority of cases the opposition to vivisection is the outcome apparently of a very strong conviction. Where this is the case, reasons in favour of vivisection may perhaps, without injustice, be assumed to be like water upon the sieve of the Danaides; but, if reasoning in favour of vivisection should even here be of any avail, one might urge the following considerations in its favour: the good that results from medical research is everywhere present with us; the infliction of the necessary suffering for the attainment of that good is relatively small; and with regard to that suffering, we have only to remind the opponents of medical research that even if they succeeded better than they can ever hope to succeed, and were able to put a stop to all vivisection in England, still the animal suffering would not be lessened, for those engaged on medical research on the Continent at present and the future generations of men like them, both in England and on the Continent, would continue the work until the preventible human suffering had been overcome.

The anti-vivisectionists may delay the acquirement of the knowledge through which alone that suffering can be overcome, but they are powerless to lessen the animal suffering which must be inflicted before it can be obtained. The course has to be traversed, and will be traversed, in spite of the hindering, and if the anti-vivisectionists would listen to reason, they could learn both that the animal suffering is minimised; and also, perhaps, that it was not any political agitation that introduced to the vivisectionist the use of chloroform and morphia, which no one more than he knows to be the best gifts of nature to the sufferings of all her creatures.

DISCUSSION.

Miss Annie Goff (London), speaking as a nurse, objected to the methods advocated. She believed that in countries where they had been practised, cancer-grafting and needless ovariotomy had been performed.

Dr. Haughton (London) thought that the demand for State aid out of public funds to promote medical research involving experiments on animals could not be justified unless the objections entertained by many people were met more fully than hitherto. He referred to experiments which he considered misleading, such as those on mercury by a committee of the British Medical Association; and to investigations which produced no result, such as those on snake-poison in India. Public money might, however, be spent on objects as to which there was practical agreement among intelligent and well-informed people.

Dr. Chapman (Paris) commented on the growing tendency in England to call upon government for a greater variety of help. He believed that when a government had provided for its country's defence, and for the conduct and administration of justice, its proper functions were nearly exhausted. There had been many signal failures in medical investigations, and he thought we should be slow to ask for State aid in conducting them.

Dr. Tomkins, in reply, said that even if it were true that much scientific work had produced small results, this would not be a reason for ceasing from it. Government spent money freely in experimental work connected with explosives, ships, and guns, and in these even negative results were valuable. So with scientific work. The suggestion that the State should do nothing was bad in face of what is being done by the Local Government Board in England; and he urged that the scientific work of that department should be placed on a more complete and satisfactory basis.

Suggestions for the Constitution of an International Convention on Hygiene.

BY

Dr. Ernst Below, Cönnern, Germany, late Physician-in-Chief to the Mexican Central R. R. Hospital, Professor of the Faculty of Medicine, Mexico.

A. The experiences of the last 12 years have proved that the civilized world can be invaded at any time by new and unknown epidemics, which arise generally from the less civilized parts, mostly from the tropical or subtropical centres of traffic, where sanitary control is insufficient. Even the strictest control there by one or another government is not sufficient to find out the necessary particulars about the origin, the march, and the extermination of an epidemic, unless the governments of all civilized nations co-operate. For such a purpose we need an international co-operation, guided by the principles of medical, climatological, and hygienic science and practice. The formation of such an *International Hygienic Convention*, as it may be called, is the first and principal suggestion.

B. This International Hygienic Convention may be established on similar principles to the Postal World's Union. Four committees ought to be elected, each central committee consisting of 5, 8, or 12 members (professors of Hygiene and their assistants) and being entitled to elect sub-committees for the different places in the various zones. I.—The committee for hygienic inquiries, *i.e.*, for elaborating inquiries about meteorology, climatology, physiology, pathology, sanitary measures, hygienic observations, and experiments (reports to be sent annually or bienially to the prominent physicians in the different latitudes and altitudes, especially in the tropics and sub-tropics). II.—The committee for election of those four principal central committees, constituting the International Hygienic Convention, and for the election of all the necessary officers for observation stations, for the scientific expeditions, and for executive international health officers. III.—The financial committee, for collecting funds for international sanitary objects, which no civilized government should refuse. IV.—The governmental committee, to solicit the moral and essential help of the respective governments in regard to medical education and executive measures, in regard to financial funds and instruction and equipment of health officers. Or, if it should be more convenient, *only one Central Committee*, for taking into consideration all the necessary arrangements, may be elected to begin with.

C. The work of the four committes, which may meet in some central place every two or three years, should consist in a strict observation and control of everything which could concern the origin, the progress, and the extermination of an epidemic. For this purpose the attention of the central committees should be directed to the following three principal points:—1. Scientific experiments; 2. Practical medical experience; 3. Sanitary and hygienic measures.

The object of the work of the committee will be:—1. Formation of scientific stations, and observations at different important places; 2. Establishment and constant reorganization of a regular international central board of health, with its sub-committees, with executive power for preventing epidemics, and helping to fulfil all the international hygienic duties; 3. Co-operation, scientific and practical, with a well distributed medical staff throughout all the countries belonging to this International Hygienic Convention.

Those co-operators are to be chosen from out the number of all the physicians who show sufficient ability and interest in answering the named inquiries. This will be the duty of the election committee, after getting the answers to inquiries instituted.

Fuller information about this important subject is given in papers read before the International Medical Congress, 1890, at Berlin, in Section 16; at the Congress of Physicians and Naturalists at Heidelberg, 1889, in Section 25; and at the Bremen Congress, 1890, in Section 25; the first-named has not yet been printed separately, but may be found in the Transactions of the International Medical Congress of Berlin.

Wednesday, 12th August, 1891.

The Chair was successively occupied by
Dr. Ed. Ritter von Hoffmann (Vienna); and
Dr. W. P. Ruysch (The Hague).

American Municipal Hygiene in Relation to the Housing of Labour.

BY

E. R. L. Gould, Ph.D., Expert, U.S. Department of Labour, Washington.

Within the memory of the most of you whom I have the honour to address to-day, what we may call the social problems of the city were of little importance in the United States. Optimists there were who assured us confidently that we should never feel their pressure, the power of assimilation, an unlimited territory, and unrivalled facilities for economic betterment affording an effectual shield. But these prophets counted without their host. Their vision did not include the modern city with its corruption, misrule, and neglect; with its teeming multitudes crowding one another for room, panting for air, and struggling for a meagre livelihood.

The American city creates itself with appalling suddenness. It seems possessed with octopus' arms, despoiling weaker neighbours on the one side and gathering in fully three-fourths of foreign immigration on the other. A short half-century ago the urban population of the United States was 8·52 per cent. of the whole; to-day it is 29·12 per cent., in other words, almost one person out of every three, in a country of such immense territorial area, lives in some centre having over 8,000 inhabitants. During the lifetime of a single generation it has nearly doubled. In 1860, 16 persons out of every 100 were city residents; in 1890, 29. In the North Atlantic tier of States one-half, and in the northern central division one-third of the people belong to urban communities. The following table, drawn from the last census, will portray clearer than words the rapid increase of population in a few individual

cities. It is not a partial record, the whole number of those having upwards of 100,000 souls each being included :—

Cities.	Population, 1890.	Per Cent. of Increase during 10 Years.	Cities.	Population, 1890.	Per Cent. of Increase during 10 Years.
New York, N.Y.	1,515,301	25·62	Detroit, Mich.	205,876	76·96
Chicago, Ill.	1,099,850	118·58	Milwaukee, Wis.	204,468	76·90
Philadelphia, Pa.	1,046,964	23·58	Newark, N.J.	181,830	33·20
Brooklyn, N.Y.	806,343	42·30	Minneapolis, Minn.	164,738	251·35
St. Louis, Mo.	451,770	28·89	Jersey City, N.J.	163,003	35·02
Boston, Mass.	448,477	23·60	Louisville, Ky.	161,129	30·20
Baltimore, Md.	434,439	30·73	Omaha, Neb.	140,452	360·23
San Francisco, Cal.	298,997	27·80	Rochester, N.Y.	133,896	49·83
Cincinnati, O.	296,908	16·37	St. Paul, Minn.	133,156	221·07
Cleveland, O.	261,353	63·20	Kansas City, Mo.	132,716	137·91
Buffalo, N.Y.	255,664	64·80	Providence, R.I.	132,146	26·02
New Orleans, La.	242,039	12·01	Denver, Colo.	106,713	199·51
Pittsburg, Pa.	238,617	32·58	Indianopolis, Ind.	105,436	40·43
Washington, D.C.	230,392	29·71	Allegheny, Pa.	105,287	33·81

These statistics show that cities which 10 years ago counted already more than half a million each have added more than two-fifths to their number during the decade, while the average rate of increase of the whole 28 has been 45 per cent. New York grew one fourth during the same time that London gained a tenth, and Paris a twelfth. This rapid concentration of population gives rise to grave dangers, the most far-reaching of which to my mind is the herding of the labouring masses in insanitary dwellings with all the physical and moral consequences attendant thereon.

About 25 years ago the moral conscience of New York awoke in earnest. This action was exemplified in the organization of a Health Department pursuant to an Act passed by the State Legislature in the preceding winter. Legislative activity itself had been powerfully stimulated by a public-spirited citizen's association, who followed up the labours of a State commission that had been without practical results, and laid bare to the public a frightful state of things. The most densely populated ward in the city was found to exceed the East London district by 60 per cent.—290,000 as against 175,000 people to the square mile.* Four hundred and ninety-five thousand of New York's total 850,000 lived in tenement-houses and cellars. In typical houses of this kind less than one-third of the bedrooms had any provision whatever for receiving light and air, except through a door leading to the family living-room. The vast majority of this great multitude were compelled to sleep in rooms that were dark, unventilated, damp, and pestilential. Of water-closets and plumbing generally, the most harrowing tales were told. The drainage most often had no connexion whatever with the sewer. No authority expostulated with the landlord

* The most densely populated ward of New York to-day contains one-third of a million to the square mile.

when he located a privy under the stairway or at the end of a dark hall for the sole and undivided use of from 60 to 100 persons, any more than it hindered him from running up a rear tenement on the unbuilt portion of his lot, so close to the front that light and air were almost entirely shut off from the denizens of the lower floors. In fact, the regime of "laissez-faire" was in full swing; the death-rate was one in 33.

The new Health Department had no sooner entered upon its functions than the Legislature confided to it a limited sanitary control over tenement and lodging houses. An inquiry made at the outset into the condition of these classes of dwellings showed that, out of a total of 18,582 tenement houses in the city, 52 per cent. were insalubrious, while 32 per cent. of the whole had reached this state "purely "from overflowing accumulation of filth, want of water-supply, and "other results of neglect." The next 12 years' efforts were mainly directed to vacating cellars as places of residence, putting ventilating windows into dark bed-rooms, lighting and airing hallways, arranging water-closets, cleansing and ventilating privy-vaults, improving drainage, whitewashing walls and ceilings, and cleansing, generally, yards and areas. One result accomplished was the lowering of the death-rate to 1 in 38. In 1873 the Health Department was re-organised, and from time to time since, notably in 1879, 1881, and 1887, its powers in relation to the subject we are now discussing have been largely increased. Let us see how the case stands to day.

At the head of the Health Department of the city of New York is the Board of Health, which consists of the President of the Board of Police, the health officer of the port, and two commissioners, one of whom must have been a practising physician for at least five years preceding his appointment. The other commissioner, who is by designation, the president, must not be a physician. Both commissioners hold office for six years. The Department of Health is divided into two bureaus: one, the sanitary bureau, the chief officer of which is called the sanitary superintendent, who at the time of his appointment must have been for 10 years a medical practitioner, and for three years a resident of the city; the other, the bureau of records, dealing with vital and other statistics. The sanitary bureau is composed of four divisions, two of which, that of general and special inspection, and that of plumbing and ventilation are of particular interest to us.

In order to make the semi-annual visitation of tenement houses* required by law, and to enforce the various regulations of the sanitary code, two officers and 43 policemen of good record, and tried experience, are detailed by the Board of Police to serve continuously under the

* The legal definition of a tenement-house: is "every house, building, or "portion thereof, which is rented, leased, let, or hired out to be occupied, or is "occupied as the home or residence of three families or more, living independently "of each other, and doing their cooking upon the premises, or by more than two "families upon any floor, so living and cooking, but having a common right in the "halls, stairways, yards, water-closets, or privies, or some of them."

Health Department. They are known as the sanitary company of police, and being amenable to the Board of Police for discipline, they know that their tenure of office depends upon good behaviour. Consequently they learn to do their best, and to take pride in their work. While on inspection duty, each sanitary policeman carries a memorandum book, in which he enters the street and number of the house, date of inspection, and notes if any cause for complaint is found.* He rectifies minor nuisances himself, but such as he cannot deal with, either through the unwillingness of the party responsible, or because of lack of technical knowledge, he calls to the attention of the Board of Health. An order is then made, which he ordinarily executes, but always, where technical questions are involved, the matter is placed in the hands of one of the regular sanitary inspectors for inquiry and report, before final disposition is made. One of the most important duties of the sanitary police is to make night inspections of tenement and lodging houses, to see that overcrowding does not occur. This function is by no means infrequently exercised.

For special—one might, perhaps, better call it technical—sanitary inspection, New York is divided into 25 districts, to each of which is assigned an inspector. To this official are referred citizens' complaints for investigation and recommendation. He must possess a thorough knowledge of his district, make a general sanitary inspection of it from time to time, informing his superiors of all causes for complaint, and when called upon make a special report upon localities which may become dangerous to life and health. He is required further to render expert service by inspecting, during their construction, and again after their completion, all new and remodelled buildings in his district; to see that the regulations of the Board of Health regarding dimensions, safety, plumbing, drainage, light, and ventilation are fully observed.

The sanitary requirements laid down for buildings which were already occupied as dwellings when the Board of Health was created, may be briefly summarised as follows:—No construction can be used as a tenement or lodging house unless the halls open directly to the external air without room or obstruction of any kind at the end, and unless they have also a ventilator at the top, of a design sanctioned by the inspector of buildings. All inside rooms must have ventilating or transom windows of three square feet in area on two of their sides, through both of which the air from the outside may be drawn. Water-closets must exist in the ratio of one for every two families (or 15 lodgers in the case of lodging-houses). These, as also sinks, must be provided with doors, soil-pipes and traps, properly ventilated, and the necessary fixtures for cleansing and flushing. All sewer connexions, drainage, and plumbing work are required to conform in plan, materials, and workmanship to the directions of the Board of Health. Privy vaults can only exist under a special permit. Likewise, the continuance of basement cellars as places of habitation is stringently regulated and

* A list of subjects upon which sanitary policemen make report on their rounds of inspection is given in Appendix A.

subjected to the pleasure of the Board. Garbage-boxes, clean areas and yards, sound roofs, protected stairways, and fire-escapes are enjoined. Tenement houses must be carefully inspected twice a year, in addition to such inquisitions as naturally follow complaints, and every interior disposition thoroughly cleansed at the pleasure and to the satisfaction of the Board. In addition, every owner, lessee, or lodging-house keeper, must thoroughly whitewash the walls and ceilings semi-annually in April and October. Six hundred cubic feet of air space in tenement, and 400 feet in lodging-houses is stipulated for each occupant, and when this limit is passed the Board has the authority to make the necessary reduction. Whenever a tenement house gives shelter to more than eight families, and the owner does not himself reside therein, the Board may require him to keep a janitor or other responsible agent on the premises. The sanitary authorities are empowered to order the vacation of any building or part of building "which by want of repair has become " dangerous to life, or is unfit for human habitation, because of defects " in drainage, plumbing, ventilation, or the construction of the same, or " because of the existence of a nuisance on the premises, and which is " likely to cause sickness among its occupants." Service is made by posting the notice conspicuously in the building and personally notifying the owner, lessee, agent, occupant, or whoever is in charge. In case the responsible party cannot be found, lives outside the city, or evades service, mailing the notice to his last known address is sufficient. A vacating order may take effect within 24 hours after service. Every owner and person having control of tenement and lodging-houses must file with the health authorities a statement giving his name, address, a description of his property, the number of rooms and apartments, the number of families occupying them, and the forms of business or occupation pursued on the premises. This power of vacation proves a most effective weapon. Twenty-nine such orders were issued last year in New York, and in every instance, before being executed, the proprietors made the improvements demanded.

The penalties attached to violations of any of the foregoing provisions are fines ranging from 10 to 100 dollars, or imprisonment not exceeding 10 days, for every day's neglect. The judge may combine fine and imprisonment if he choose. A further liability of 10 dollars a day during the continuation of the offence is also incurred, in addition to the expenses of abatement. Appropriately enough, moneys coming from these sources pass to the "tenement-house fund." It was created in 1879, and consists of 10,000 dollars annually appropriated for the employment of 48 physicians, who, during the summer months, visit, prescribe, give advice for the care of sick and infants, and correct, as far as possible, insanitary conditions in the tenement districts of the city. Suit is brought in a court of higher resort, and trial is had before a judge, unless the defendant demands a jury upon a question of fact.

Such are the remedial powers at the disposal of the New York Board of Health in relation to the housing of the industrial classes. It is invested as well with certain preventive faculties, which are, if anything, more important. It has control over the construction of all new

tenement and lodging-houses in respect to light and ventilation, and of every newly erected public and private building as regards plumbing and drainage. All work must be done in strict accordance with plans having its written sanction. Fulfilment is secured through frequent inspection, and the stoppage of further progress when prescriptions are being violated. The law ordains that tenement or lodging houses on ordinary lots may not extend farther than to 10 feet from the end of the rear lot line, and must not cover more than 78 per cent. of the ground. Air-shafts or open courts take up the remaining 12 per cent. Exceptions are made of corner lots, where four feet of open space is required at the rear, so as to ensure circulation of air throughout the whole block. Rooms must be eight feet high, and every sleeping apartment have at least one window of specified dimensions, admitting light and air directly from the street or yard. A sufficient water-supply is furnished to each floor, and one fire-place or chimney to every family apartment.

Plumbing and drainage are completely under the supervision of the Health Department. Every plumber must there register his name and address, and do his work in conformity to specifications officially approved and left on file. The value of the materials and workmanship are subsequently demonstrated by the application of the pressure test of ten pounds to the square inch, without which no plumbing is accepted. There is now no trouble in fulfilling all requirements, since the water service is not available until the Department of Public Works, which controls it, has been duly notified by the sanitary authorities that the plumbing has been satisfactorily done.

Finally, a permanent commission on tenement-house reform, composed of the mayor, one commissioner of health, a delegate from the Bureau of the Inspection of Buildings and the Commissioners of Public Works and Street Cleaning, meets annually to formulate recommendations to the State Legislature for improving existing laws.

What have been the effects of this sanitary legislation? Has it been really enforced? In truth, it must be admitted that as the legislation was progressive, so was its execution; and, furthermore, that the latter did not always keep pace with the former. Landlords whose instructions in relation to their property were usually comprised in the laconic formula, "collect the rents in advance—failing, eject the tenants," were liable to demur when overcrowding was repressed, and the sanitation of the premises improved at their expense. Speculative builders and old-fashioned plumbers could not at once be brought to see the necessity of providing so much light and air or an approved system of drainage for the use of the poor man. Alike, these two classes regarded the provisions of the law as an outrageous interference upon private rights; in other words, a certain curtailment of their sources of revenue. But whenever they were discovered evading the rules, they found to their cost that it was cheaper to obey. The courts uniformly sustained the Board, and even brushed away some misty cobwebs about the unconstitutionality of the State, thus aiding the labourer to get a sanitary home. The Health Department has acted continuously with

tact and firmness, progressively raising its standard in response to an enlightened public opinion.

A few pages back you will recall a description of the shelters offered to wage-earners in 1866. Let me supplement it with an official picture* of the tenements erected to-day, not for purposes of philanthropy, be it understood, but for speculation. "The plans upon which "tenement-houses are now built are in many respects superior to the "plan of a model tenement-house which was awarded first prize in the "famous Plan Competition of 1879, although that plan at the time "was generally regarded as too utopian ever to be equalled by tenement "houses erected by speculative builders in this city. The tenements "now building for four families on each floor cover not more than "78 per cent. of inside lots. They are permitted to extend to within "10 feet of the rear lot line, as this secures larger courts to light "interior rooms. These courts must in each house aggregate 265 "square feet; and, inasmuch as a number of houses are usually built "together, the rooms on each side of each of them are lighted by "windows to a common court of that area. The end rooms of each "of the four suites per floor have windows to the largest section of the "courts. These enlarged sections also on one side light the stairs and "halls, and on the opposite side light the water-closet compart-"ments. Water-closet compartments are ventilated by means of a "special shaft discharging foul odours above the roof. Fanlights are "placed over each door, where necessary, to ensure a cross-current of "air through each room. Two water-closets are required on each "floor, flushed with a copious supply of water. A sink and set of "wash tubs are provided in each kitchen, and in many cases a hot-"water supply and even bath-tubs, one for every two families, are "furnished. The light courts in houses of this grade, as well as of "other grades, are as large as is consistent with rooms of suitable "size for habitation. The ceilings of all new tenements are compara-"tively lofty, averaging over nine feet in height. Cellars have all the "light possible from windows opening on yards, courts, and areas; and "their floors are thoroughly concreted, and their ceilings lathed and "plastered. Finally, the value of the space required at the rear of all "houses on inside lots for light and ventilation is materially enhanced "by the open space of four feet required at the rear of corner houses, as "a means of securing circulation of air throughout city blocks."

Here is one result which the interference of the State has brought to New York city. Let me call your attention to another, which, though expressed in cold Arabic, tells a no less heart-stirring tale. In 1870, 51 per cent. of the population lived in tenements and apartment houses or flats. In 1890 the dwellers in tenement-houses alone numbered 73 per cent. of the whole. The death-rates per 1,000 were 28·84 and 24·58 at the two periods respectively, while the mortality of children under five years of age fell from 49·06 per cent. to 40·66 per cent. of the total mortality. Do not forget that this improvement has been

* Annual Report, New York Board of Health, 1890, p. 50.

accomplished concurrently with a gain of nearly one-fourth in the relative proportion of the labouring population to all other.*

It would be most interesting to note, did time permit, the control exercised by the sanitary authorities over the homes of the wage-earner in other principal American cities. As a whole, one may say that the provisions are more general in character, and, therefore, are apt to lose much in power of execution. Often the inspecting force is inadequate, and overcrowding cannot be attended to as it should. Nevertheless, the testimony of nearly all the municipal health authorities I have consulted is that the labourer is better housed to-day than 20 years ago. In most directions there is a well-marked and progressive tendency towards increasing State, *i.e.*, municipal, control. Younger communities, forewarned by the experience of their metropolitan sister, are forearming themselves with judicious building and plumbing laws. Chicago, St. Louis, Baltimore, Boston, Pittsburg, Newark, Cincinnati, Lowell, and Minneapolis, may be mentioned amongst others.† Herein lies the preventive features of the remedy. Good examples are never without influence. They are all the more powerful in this case, because improved dwellings force by competition an amelioration in the rest. In response to business needs, many old houses must sooner or later disappear, and those which remain, from diminishing numbers, can be more easily handled. The victory is more than half gained when the future is well provided for.

State control in reference to the homes of the working classes is the topic we are discussing to-day. There is no doubt in my mind that a beneficent tutelage has been exercised over New York. Ought it to go further? To some European communities I could name, the powers of the New York Health Department would seem quite drastic enough, but their policy has been to wipe out notorious localities that could not be any longer tolerated, instead of by an unified, active, well-equipped sanitary administration gradually to improve what already existed, and effectually to look out for the future. One dare not enter into the moral phases of this question, for so deeply do they permeate the framework of society, that one is almost disposed to sanction anything, however trenchant, which promises to give to the poor man a civilised home. I must confess that practical observation and study of the conditions under which an untold number of human beings must live in the metropolitan centres of the old world and the new, have led me to look chiefly to the only power I believe to be strong enough to cope with them, viz., the State. The existence of some form of sanitary control everywhere is the best evidence of its necessity. Let it then be endowed with sufficient authority to render its acts effective, otherwise

* There will be found in Appendix B. a table extracted from the Annual Report of the New York Board of Health for 1890, giving the proportions of infant to total mortality during the last 15 years.

† In Appendix C. will be found a complete text of the Sanitary Code of the Newark, N.J., Board of Health, in so far as it relates to plumbing and drainage. This particular one was chosen because, being the most recent, it contains the most thoroughly approved dispositions.

Front Areas.

Whether graded.	Sanitary condition.
Whether sewer connected.	

Waste Pipes.

Whether joints are connected with cement or lead.	Whether trapped.
	Whether ventilated two feet above the roof.

Soil Pipes.

Whether joints are connected with cement or lead.	Whether trapped.

General Inspection.

Cellars.	Skylights.
Stairs and balusters throughout the house.	Leaders.
	Eaves-gutters.
Walls and ceilings of halls and rooms throughout the house.	Chimneys.
	Fire-escapes.
Floors of rooms and halls throughout the house.	Water-closets, whether trapped and trap ventilated.
Slop-sinks, whether trapped and ventilated.	Privy vaults.
	School sinks.
Wash-basins, whether trapped and trap ventilated.	Privy-houses.
	Cesspools.
Bath-tubs, whether trapped and trap ventilated.	Urinals, whether properly flushed.
	Clothes-poles.
Potable water supply pipes.	Fences.
Roof.	Hydrants in yard.
Wash roof.	Air-shafts.

Ash Receptacles.

Whether sufficient.	Whether kept within stoop-line.
In sanitary condition.	

Appendix B.

Table giving the Proportion of Infant to Total Mortality in New York City during the last 15 years.

Year.	Per cent. of Total Deaths.		
	Over 5 Years.	1 to 5 Years.	Under 1 Year.
1875	51·65	20·54	27·81
1876	51·26	20·72	28·03
1877	53·03	18·66	28·31
1878	54·05	19·65	26·29
1879	54·92	18·37	26·70
1880	54·13	18·55	27·32
1881	54·08	20·83	25·09
1882	53·80	20·18	26·02
1883	59·26	15·25	25·49
1884	56·41	16·09	27·50
1885	57·21	16·71	26·08
1886	56·84	16·84	26·32
1887	56·94	17·16	25·90
1888	56·79	17·29	25·91
1889	56·77	16·70	26·54
1890	59·34	15·00	25·66

Appendix C.

Supplement to the Sanitary Code adopted by the Board of Health of the City of Newark, N.J., October 1890.

Supplement to the Sanitary Code of the city of Newark, N.J., to compel, prescribe, regulate, and control the plumbing, ventilation, and drainage of all buildings, public and private, and the connexion thereof with outside sewers, cesspools, or other receptacles, and to require plans for the same, with necessary drawings or descriptions, to be submitted to said board for inspection and approval, and to require all master plumbers to register their names and addresses at the office of the board.

Be it ordained by the board of health of the city of Newark as follows:—

Section 1. Every master plumber engaged in business in the city of Newark, N.J., shall appear in person at the office of the board of health in said city and register his name and place of business; and shall give immediate notice to said board of any change in said place of business.

Section II. Before any portion of the plumbing and drainage system of any building shall be constructed there shall be filed in the office of the board of health a plan and specification thereof signed by the owner, showing the said plumbing and drainage system entire, from its connexion with the sewer, cesspool, or vault, throughout the entire building, together with the location of all fixtures, traps, ventilating pipes, &c. Said plan and specification must be approved by the board of health and the name of the plumber attached thereto before any portion of the work shall be executed. Before any changes are made in the direction of pipes or location of fixtures they must first be approved, and said changes made on the original plan on file. In case any changes or alterations in existing systems are made, the board of health must be notified of that fact, and if in its judgment a plan of the new work is necessary, the same must be furnished. Drawings and descriptions of the plumbing and drainage of buildings erected prior to the passage of this regulation may be placed on file in the office of the board.

Section III. When an original plan of any plumbing and drainage system is filed in the office of the board of health, a fee of two dollars will be charged to defray the expenses of inspecting the plans, of filing, and superintending the testing of the work.

Section IV. The health officer shall be notified promptly by the plumber when the plumbing and drainage work of any building, or any portion thereof, is completed and ready for inspection and testing. All inspections and testings shall be made as soon as possible after such notification. Any such system put in and covered without due notice to the health officer must be uncovered for examination at the direction of said officer.

Section V. All houses and other buildings on premises abutting on a street in which a sewer is laid or shall be laid, shall be connected with said sewer by the owner, agent, or lessee of said premises, when the board of health shall so require, and written notice to connect with said sewer shall be served on said owner, agent, or lessee, personally, or by leaving a copy at his or her residence, place of abode, or in the case of a non-resident owner, by leaving a copy with an adult occupant of the premises.

Section VI. No building or premises shall be connected with any sewer, cesspool, or vault without a permit first obtained from the board of health, and it is further required that the permit shall be kept on hand during the progress of the work to which it relates, and that it shall be exhibited whenever required by the proper officers of the board. The conditions of this permit must be strictly complied with. This regulation applies to all sewers, whether on private property or in public streets or alleys. Before laying the drain from the building to the sewer, cesspool, or vault, and after the trench is graded, the bottom of the trench must be carefully rammed to avoid unequal settling of the drain. After the pipe

is laid, as the trench is filled the earth must be tightly rammed as near as possible to its original compactness. Tunnelling is prohibited, unless the consent of the board of health thereto has first been obtained.

SECTION VII. When the ground is made or filled in, the drain extending from the sewer, cesspool, or vault to the foundation wall must be of extra heavy cast-iron pipe, of such diameter as may be approved by the board of health. Such pipes shall be laid with the joints properly caulked with lead.

SECTION VIII. Where the soil consists of a bed of loam, sand, or rock, the drain may be of hard, salt-glazed, and cylindrical earthenware pipe, not less than three-quarters of an inch in thickness, free from defects, laid on a smooth bottom, free from all projections of rock. Each section must be wetted before applying the cement, and the space between each hub and the small end of the next section must be completely and uniformly filled with the best hydraulic cement. Care must be taken to prevent any cement being forced into the drain to become an obstruction. No tempered-up cement shall be used. A straight-edge must be used inside the pipe, and the different sections must be laid in perfect line on the bottom and sides.

SECTION IX. When a building is to be connected with a sewer, cesspool, or vault, it must be connected by a drain not less than four inches in diameter, having a fall of not less than one-quarter of an inch to the foot, if practicable. Old drains cannot be used for new houses, except by permission from the board of health.

SECTION X. When there is no sewer in the street on which a building faces and it is necessary to construct a private sewer to connect with a sewer on an adjacent street or avenue, it must be laid outside of the curb, under the roadway of the street, and not through yards or under houses, without a special permit from the board of health.

SECTION XI. House-drain connexions with pipe sewers must be made with Y branches in all cases where possible.

SECTION XII. All horizontal drains within and to a distance of six feet beyond the walls of buildings shall be of cast iron, with caulked leaden joints, or wrought-iron screwed joints, and shall be so located as to be readily accessible for inspection. The house drain within buildings shall be securely hung on the cellar wall or properly suspended from the cellar ceiling, unless this is impracticable, in which case it must be laid in a trench, cut at a uniform grade. The house drain and all soil and waste pipes shall have a fall of at least one-quarter inch to the foot, and more if possible. Said drains shall be provided with openings for cleansing purposes, the same to be closed by screw plugs.

SECTION XIII. A running or one-half S trap must be placed on the house drain at an accessible point near the house wall. This trap must be furnished with a hand-hole for convenience in cleansing, the cover of which must be properly fitted and made gas and air-tight with some suitable cement properly applied.

SECTION XIV. Every house drain shall have an inlet for fresh air, not less than four inches in diameter, entering on the house side of the trap and leading to the outer air, opening at some place shown on the approval plans, not less than 10 feet from the nearest window. No cold air-box for a furnace shall be so placed that it can by any possibility draw air from this inlet pipe.

SECTION XV. All cast or wrought-iron pipes and fittings must be sound, free from sand holes and other defects, and when laid underground shall have a uniform thickness of one-quarter of an inch; when placed above ground, said pipes shall have a uniform thickness of one-eighth of an inch. Where the building is over 60 feet high above the curb, pipes of the following weights shall be used, with extra heavy fittings:

2-inch, 5½ pounds per lineal foot.
3-inch, 9½ pounds per lineal foot.
4-inch, 13 pounds per lineal foot.
5-inch, 17 pounds per lineal foot.
6-inch, 20 pounds per lineal foot.

7-inch, 27 pounds per lineal foot.
8-inch, 33½ pounds per lineal foot.
10-inch, 45 pounds per lineal foot.
12-inch, 54 pounds per lineal foot.

SECTION XVI. All drain, soil, waste, vent, and supply pipes shall be as direct and concentrated as possible, protected from frost and readily accessible for inspection and convenience in repairing. When necessarily placed within partitions or in recesses in walls, soil, and waste-pipes must never be covered except with woodwork, said woodwork to be so fastened with screws (never nails) as to be readily removed.

SECTION XVII. Every vertical soil and main waste-pipe must be of cast or wrought iron, and must extend at least two feet above the highest part of the roof or coping, except in the case of flat-roof tenement houses, in which case it shall extend at least six feet above the roof, and said pipe shall have a diameter above the roof at least one inch greater than the pipe proper, but in no case shall it be less than four inches in diameter above the roof. No cap or cowl shall be affixed to the top of such ventilation pipe, but a strong wire basket shall be provided and securely fastened thereto. Each length shall be securely fastened, and in the case of each line of soil-pipe it shall rest at its foot on a pier or foundation to prevent settling. All joints in cast-iron drain, soil, or waste pipes must be so filled with oakum and lead and hand-caulked as to make them gas tight, and the amount of lead used shall be not less than 12 ounces to each inch diameter of the pipe so connected.

SECTION XVIII. There shall be no traps placed on vertical soil and waste-pipes.

SECTION XIX. All changes in direction in cast or wrought iron pipes shall be made with curved pipes, and all connexions with Y branches and one-sixteenth or one-eighth bends, if possible.

SECTION XX. Soil, waste, and vent pipes in an extension must be extended above the roof of the main building, when otherwise they would open within 20 feet of the windows of the main house or the adjoining house.

SECTION XXI. The least diameter of soil-pipe permitted is four inches. A vertical waste-pipe into which a line of kitchen sinks discharges must be at least three inches in diameter, if receiving the waste of five or more sinks, and shall have 2-inch branches.

SECTION XXII. When lead pipe is used to connect fixtures with vertical soil or waste-pipes, or to connect traps with vertical vent-pipes, it must not be lighter than D pipe.

SECTION XXIII. All connexions of lead with iron pipes must be made with a brass sleeve or ferrule, of the same size as the lead pipe, put in the hub of the branch of the iron pipe and caulked with lead. The lead pipe must be attached to the ferrule by a wiped or overcast joint. All connexions of lead waste and vent pipes shall be made by means of wiped joints.

SECTION XXIV. Every water-closet, urinal, sink, basin, wash tray, bath, and every tub or set of tubs and hydrant waste-pipe must be separately and effectively trapped, except where a sink and wash tubs immediately adjoin each other, in which case the waste-pipe from the tubs may be connected with the inlet side of the sink trap. In such a case the tub waste-pipe is not required to be separately trapped. Urinal platforms, if connected to drain-pipes, must also be properly trapped, and a supply of water so arranged as to always maintain the seal of said traps. In no case shall the waste from the bath tub or other fixture be connected with a water-closet trap.

SECTION XXV. Traps must be placed as near the fixtures as practicable, and in no case shall a trap be more than two feet from the fixture.

Each and every trap shall be ventilated either by a special vent pipe of suitable size, extending at least two feet above the highest part of the house (or into a special pipe erected for ventilating purposes only, in which case the area of the special vent must be increased as it passes upward, so as to correspond to the combined area of all branch vents passing into it).

SECTION XXVI. Traps must be protected from siphonage, and the waste-pipe leading from them ventilated by a special air pipe, in no case less than 2 inches in diameter for water-closet traps and 1½ inches for other traps. Except in private dwellings, the vertical vent pipes for traps of water-closets in buildings more than four stories in height must be at least 3 inches in diameter, with 2-inch branches to each trap, and for traps of other fixtures not less than 2 inches in diameter, with branches 1½ inches in diameter, unless the trap is smaller, in which case the diameter of branch vent-pipe must be at least equal to the diameter of the trap. In all cases vertical vent-pipe must be of cast or wrought iron.

SECTION XXVII. Vent-pipes must extend 2 feet above the highest part of the roof or coping, the extension to be not less than 4 inches in diameter, to avoid obstruction from frost, except in cases where the use of smaller pipes is permitted by the board of health. "*Where more "convenient, vent-pipes from traps, or combinations of the same, may be "connected to the main soil-pipe extension above the highest waste inlet.*" These vent-pipes must always have a continuous slope, to avoid collecting water by condensation.

SECTION XXVIII. No trap vent-pipe shall be used as a waste or soil-pipe.

SECTION XXIX. Overflow pipes from fixtures must in each case be connected on the inlet side of the trap of the same fixture.

SECTION XXX. Waste-pipes from safes under fixtures shall be discharged into an open sink or upon the cellar floor. In no case shall they be connected with the soil-pipe, house-drain, or sewer. The waste-pipe from refrigerators shall in no case be directly connected with any soil or waste-pipe, or with any drain or sewer, or discharge upon the ground.

SECTION XXXI. The sediment pipe from kitchen boilers must be connected on the inlet side of the sink-trap.

SECTION XXXII. Water-closets must never be placed in an unventilated room or compartment. In every case the compartment must be open to the outer air, or be ventilated by means of a shaft or air duct.

SECTION XXXIII. All water-closets within the house must be supplied with water from separate tanks or cisterns, the water of which is used for no other purpose. A group of closets on the same floor may be supplied from one tank. Pan-closets are prohibited, and plunger closets with valve attachments are prohibited, except on special permit from the board of health.

SECTION XXXIV. Water-closets, when placed in the yard, must be so arranged as to be conveniently and adequately flushed and their water supply pipes and traps must be protected from freezing. The compartment of such water-closets must be ventilated by means of slatted openings in the doors and roof.

SECTION XXXV. All waste, overflow, or vent pipes shall be of lead, cast or wrought iron.

SECTION XXXVI. Rain water leaders, when placed inside of any building, must be of cast-iron, with leaded joints; wrought iron screwed joints; or copper, with soldered joints. When outside of the building, and connected with the drain, it must, if of sheet metal with slip joints, be trapped beneath the ground or just inside of the wall, the trap being arranged so as to prevent freezing. In every case where a leader opens near a window or a light shaft, it must be properly trapped at its base. The joint between a cast iron leader and the roof must be made gas and water tight by means of a brass ferrule and lead or water pipe properly connected.

SECTION XXXVII. Rain water leaders must never be used as soil, waste, or vent pipes, nor shall any soil, waste or vent pipe be used as a leader.

SECTION XXXVIII. No steam exhaust, blow-off or drip-pipe from a steam boiler shall connect with the sewer or with any drain, soil-pipe, or waste-pipe. Such pipe must discharge into a tank or condenser, from which a suitable outlet to the drain may be provided.

SECTION XXXIX. Every new plumbing system must be tested by the plumber, by the air, water or peppermint test, in the presence of a proper

officer of the board of health, after the several lines of soil and waste-pipes, with their respective branches, are in place and the lead connecting pieces are attached. All defective joints must be made tight, &c.

Section XL. Cellar and foundation walls must be rendered impervious to dampness, and the use of asphaltum or coal-tar pitch in addition to hydraulic cement is recommended for that purpose.

Section XLI. Cellars and areas shall not be connected to the house-drain, unless absolutely necessary. If connected with the house drains, running taps with cut off valves and proper water-supply must be provided. Dry cesspools must be used to care for surface water from cellars and areas when practicable.

Section XLII. Sub-soil drains must be provided when necessary, and in no case shall these drains have a direct connexion with the sewer or the drainage system of any building.

Section XLIII. Yard and open light courts must always be properly graded, cemented, flagged, or well-paved, and properly drained; when the drain is connected with the house-drain, it must be effectively trapped.

Section XLIV. Any person or persons or corporation failing to comply with, offending against, or violating any of the provisions of Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, or 43 of this ordinance, shall, on conviction thereof, pay a penalty of fifty dollars for the first offence, and for the second and each subsequent offence the sum of one hundred dollars.

The Housing of the Poorer Classes.

BY

Theodore Thomson, M.A., M.B., Medical Inspector of the Local Government Board, formerly Medical Officer of Health for Sheffield and for Aberdeen.

To every medical officer of health, but more especially to him who has charge of a large urban district, the better housing of the poorer classes is an ever-present problem, of which the partial solution is of difficulty sufficient to occupy a large share of the attention he gives to his duties. Such is the magnitude of the task, so great are the various difficulties to be overcome, and, too often, so small is the meed of success with which his efforts are rewarded, that he may be excused if he occasionally allow a feeling of discouragement to overcome him.

It is not that we of the present day house our poor worse than did our predecessors of 50 years ago. On the contrary, comparison of the evidence around us with the evidence handed down to us from the past, shows clearly that in this respect we have improved. Yet one cannot but feel that progress is slow, and that an almost overwhelming task lies before the worker in this field. He who has to deal practically with the subject soon discovers that the poor, with the better housing of whom he is concerned, are so dissimilar, that he makes for himself a rough division of them into two classes, for which, in some respects, different treatment has to be adopted. There is the class constituted by

those whose incomes are small, and to whom the struggle for existence is hard, but who contrive to lead fairly decent and self-respecting lives; and there is the class which comprises the failures of life: the loafer, the criminal, the drunkard, and a few to whom fate has been unkind, and who have thus sunk to a level, for their presence in which, unlike the majority of their companions, they have not themselves largely to blame. The houses of the *first* of these two classes are often fairly comfortable. No one who has much knowledge of the subject is unaware of the fact that the poor, but decent, working man does not usually inhabit a loathsome hovel. But, although the house he occupies may be as I have described it, yet he is badly off in that he pays too much rent. A middle-class person, in the receipt of 400*l.* or 500*l.* a year, would not relish having to contribute a sixth, a fourth, or an even larger proportion of his income for house-rent, as the poorer working man often has to do. And, in large towns, his house, whatever its internal condition, is usually situated in a crowded neighbourhood, and gives little opportunity to the tenant of taking country walks, and breathing the fresh country air. Neither is the poor agricultural labourer to be unduly congratulated on his advantage in this respect over his city brother, for, as a rule, the structural defects of his habitation, which often is a mere tumble-down barn, counterbalance the benefits accruing from surrounding open space. The houses of the *second* of these two classes are of a much worse type in surroundings, in structure, and in internal condition. Closely huddled together, with filth of all descriptions accumulated in the vicinity, damp, dark, and dirty are the houses of the lowest social stratum.

Both at home and abroad, the poor may be roughly classified in some such way as this, and those who deal with the amelioration of their dwellings, find that in the housing of the poorer classes are involved two distinct problems. I do not mean to say that many of the remedies which apply to the evil conditions affecting the one class do not also apply to those affecting the other; but I do hold that, while there are remedies common to both, there is a point at which, because of the very different characteristics of these two classes, divergence takes place in the course to be pursued.

During the past 40 years there has been, at home and abroad, a great deal of legislation bearing both directly and indirectly on the housing of the poorer classes. Such legislation has been very different in different countries; the rate of progression of such legislation, and the manner in which the laws have been put in force, have varied much; and, at the present day, the leading civilised countries are far from having the same legal provisions on this subject. Such meetings as the present serve as a means of bringing together from these various countries delegates who can interchange observations, and who may possibly learn from each other something which may subsequently bear useful fruit. It may well be, indeed, that the legislation which is suitable for one people is unsuitable for another; or that means other than legislative adopted with success for the amelioration of the condition of

his house rent to be lowered, or are facilities to be given him to live farther from his work? And if so, how are all or any of these things to be done? All these are matters which lie at the root of the question; and the medical officer of health, while he knows that such things are officially beyond his province, yet feels that this health question is really an economic question, and that the true solution is an economic one. In the same way the dilapidated building occupied by the poorer class of agricultural labourers is likely to persist so long as the labourer is in receipt of a wage that does not enable him to pay a rent sufficient to return any interest on the capital necessary to erect a decent cottage. Should his sanitary authority build him a cottage and let it to him at a loss? Or should he have a higher wage, and how is he to get it? Or should he have a land allotment with his cottage to enable him to pay a remunerative rent? These are not questions for a medical officer of health to settle, but the settling of these will do much to settle the sanitary question with which he is concerned.

Something else will have to be done with the lowest class of all. Of these it may be said that were they to-morrow housed in a palace, they would in ten days make it a pig-stye. For them remedies are required other than those needful for the class immediately above them. No doubt they will, despite themselves, to some extent be benefited by sanitary improvements of their dwellings, by demolition of unhealthy areas, by improved lodging-houses under the existing laws. But so long as there is an insanitary building left they will go to it, for they do not admire sanitation. They will avoid all model dwellings, for they do not wish to be cleanly and orderly as there prescribed by rule, and they will destroy and fill with filth any interior that becomes theirs. It is to be hoped that in process of time the benefits of education will effect some improvement in the members of this class, but it must be a long time before these benefits create any appreciable effect. Private effort, such as the noble work of Miss Octavia Hill and others, is one of the means to which one may look with hope. Possibly registration of all the worst class of houses, somewhat on the Glasgow model, with frequent and stringent supervision of the habits of the inmates might be useful. Such supervision would not be pleasant to the inmates; but it is, perhaps, desirable that life should not be made too pleasant for this class of society, most of whom deserve no sympathy other than that which one bestows upon the victims of heredity.

There are some points of my subject into which I have not gone at any length, and others to which I have not even alluded. But the time limit renders it impossible for me to consider every side of a subject so vast; and what I have set myself to do is rather to convey the leading impressions suggested to me by my experience as a medical officer of health. Briefly summarised, these impressions are, that although the present sanitary laws are open to improvement, yet that the most crying present need is not so much change of, or addition to, those as a thoroughly efficient and complete system of health administration by capable and independent medical officers throughout the country; and that the final and complete solution of the problem of how to house the

poorer classes is inextricably bound up with a great social difficulty of which the settling will come to pass, either prior to, or coincidently with, the settling of that which has been the subject of this paper.

The State and the Homes of the Poor.

BY

JOHN HAMER, Hon. Secretary of the Mansion House Council on the Dwellings of the Poor.

Sanitary reformers all the world over have great cause, *not* "to rest," but certainly "to be thankful," when they review the great advantages which have been gained during the past century. In 1774 the death-rate in London was 48·1, in 1889 it was 17·4. But the progress of science, as applied to the prevention of disease and the prolongation of life, has been vastly accelerated during the last 25 years. Sanitary science owes its position to-day most of all to the fact that the world has begun to perceive that it is to its interest to take care of the people, and especially of the wage-earning classes. Philanthropy assumes a totally different aspect in the eyes of the world when it is able to demonstrate that it pays to keep the people healthy. The health of the people is the wealth of the State, for though it would indeed "be impossible to estimate more than very roughly the loss of money "which a community suffers from the loss of wage-earning power "during sickness, it needs no argument to show that the amount every "year is simply enormous." If this be a mean and mercenary way of looking at the matter it is at any rate one which has enabled reformers to convince mankind that it is better that its workers be decently housed in healthy homes rather than allowed to herd in hovels which become centres of disease and a danger to the whole community. The growth of public opinion as to the value of healthy surroundings is even yet very slow in comparison with the real importance of the subject, and we look with fervent aspiration to the time when society shall have become so permeated by a love of order, a sense of decency, and a proper spirit of independence, that the people themselves shall insist upon "a healthy home" being as much their birthright as the air we breathe or the light we love.

State regulations can do much to improve the condition of the people, but no legislation will make good citizens unless the citizen understands, appreciates, and adopts the laws made. Even when this is done, and the self-government of the people becomes a realised fact, there will still remain certain vital matters which must ever be of national importance, and which cannot be left to local *laissez-faire*. Health and education are two such matters, and their control ought

to be matters undertaken by the State. Ignorance fosters crime, insanitary conditions result in enfeebled manhood, and miserable homes produce and perpetuate a low state of mental and moral health. Co-operation and building societies, which enable the people to acquire their own homes, distinctly raise the level of the working class, and give them a personal interest in promoting sanitation. But even such well-meant methods may be abused, when the greed of the money-maker steps in and defeats the aim of the philanthropist. I believe it is true that one of the largest artizans' dwellings societies in London no longer strives first to get the workman to buy his house, but attaches more importance to paying good dividends to its shareholders. Improved dwellings, especially on the block-system, are by no means an unmitigated blessing, though they do not deserve all the condemnation bestowed upon them. In large towns it would seem to be almost inevitable that such erections should exist, and under proper control they present distinct advantages as to sanitary arrangements, facilities for inspection, &c. Against them the gravest objections are their height; the rooms of some of the best are, on the ground floors, never penetrated by a ray of sunlight, whilst in the very large blocks the terrible catastrophe that might at any time result from a fire is too horrible to contemplate. Practical workers amongst the poor agree pretty much that moderate sized blocks are not disliked by decent people, but large ones, which render even comparative isolation most difficult, are not popular. All attempts at approaching the cottage system, where at all possible, are decidedly to be encouraged. The State can do a great deal by compelling railway companies to run cheap workmen's trains within a fixed zone round every large town, and the unused land frequently held by railway companies might be utilised with advantage for the building of cottages, to which cheap trains would bring occupiers. Here again the State, in the interests of the whole community, should assimilate the Sanitary and Building Acts. Otherwise such anomalies as those we suffer from in London will continue. We sweep away a rookery from Bethnal Green and permit the erection of one little better at South Tottenham. No more striking object lesson could be presented to the members of this Congress than would be seen in the course of a drive from Piccadilly to Edmonton. The entire way, about nine miles, is lined with houses, and outside the metropolitan area, where you ought to come to healthily built houses with the charming surroundings that characterise the country, you find jerry built houses by the score. These are in most cases densely packed, so that the population is already as great in proportion to the area as districts in the East of London which have long been condemned as "slums." If we cannot, like Queen Elizabeth, issue our mandate that no more houses shall be built in London, we can at any rate say that houses, wherever built, shall at least be in accordance with the elementary principles of sanitary science.

It is no part of this paper to dea with political questions. Sanitary reform and the health of the people ought to be far removed from the arena of party conflict. Nevertheless, the ownership of the land will,

unless wisely and prudently dealt with, very soon become a crucial question which may provoke the fiercest passions and lead to the direst results. In our own country the greatest variety exists owing to the differences of tenure. In Leeds scarcely a house is built upon anything but freehold land, whilst in Sheffield and Huddersfield hardly a house is to be found that is not erected on leasehold property at present irredeemable.

Municipal enterprise can do, and has done, a great deal for the people, especially by the provision of lodging houses. Examples are found in Glasgow and Liverpool. But nothing short of central State control can, or should be allowed to, regulate vital necessities of life. Under such control, I would place water-supply, artificial lighting, the provision of open spaces to secure abundant fresh air, and sufficient medical supervision to ensure the stamping out of infectious disease, and the duty of providing against invasions of foreign epidemics. No commercial company ought to be allowed to make money out of a monopoly in the supply of the vital necessities of a healthy home. Decentralise as rapidly as the growing intelligence of the people will permit, but you must always have Imperial control over local authorities if you want to secure the efficient working of the Sanitary Acts. Without such centralised supervision, one locality, by neglecting its duties, may spread an epidemic throughout its better administered neighbours. Medical officers of health should be State servants, responsible to a Ministry of Public Health, and not under the absolute control of property owners constituting the local authority, whether it be a town council or a parish vestry. The sanitary staff of every locality should be of a much higher status, and subjected to the test of proper examination, whilst the pay of medical officers who look after the health conditions of our towns should be higher than at present. It seems incredible that one of the largest districts in London last month advertised for a medical officer of health to superintend the sanitary condition of a population of 120,000, and offered a salary of 200*l.* a year, with the stipulation that he should attend *half an hour each day at the office!* And this is a district quite recently convicted by a public inquiry of the grossest negligence in sanitary administration.

In my opinion, and I speak from some years of personal experience, the soundest policy for the regulation by the State of the homes of the poor is through such a machinery as I have indicated, supported by a more cordial co-operation of all classes in the local government of the country, and by the gradual and persevering education of the people in the duties and responsibilities they owe to each other and to all in the maintenance of cleanly and well-ordered homes.

On the Housing of the Poorer Classes,

BY

S. M. Burroughs, F.R.G.S.

The chief difficulties in the way of the housing of the poorer classes appear to be:—

1. The necessity of living near their work, which leads to congestion in towns and cities.
2. The dearness of land, which arises partly from the same cause.
3. The rates and taxes upon houses.
4. The average inability to pay for good houses among the working classes.

With regard to the first difficulty it could be mitigated or removed by free travel; and while this may appear very Utopian to some people, it is, I believe, easily practicable, and that without robbing anyone for the benefit of others. At the present time travelling is made unnecessarily expensive, as many seats are unoccupied and the cost of selling and collecting tickets and keeping accounts of the same is very great. Free travel of course involves the purchase of railways by the State. They now make average dividends of 4¼ per cent., whereas the Government securities would float at 2 per cent. The saving of interest alone to the public would amount to 10,000,000*l.* per annum. The strongest objection to free travel is, that if it has to be paid for out of the Consolidated Fund, the pecuniary benefit would go chiefly into the pockets of owners of suburban lands. An illustration of this is afforded by the case of the free ferry at Woolwich. This has made the hitherto swampy and useless lands on the north side of the river available for building purposes, and a large rental value has been added to the lands of North Woolwich, which previously possessed no rental value to speak of. These increased values are a great deal more than enough to pay for the cost of the ferry; in fact, the abolition of fares on the ferry immediately increased the value of land in North Woolwich. It is observed that the constructions of toll roads, by making hitherto inaccessible lands available for use, increases their value. If the tolls are abolished the land rises still higher in value. The construction of bridges and freeing them from tolls has a similar effect, and the same would be said of railways if travel were made free. The tendence of free travel is to make land in the suburbs equally valuable to that in towns. It is therefore submitted that it is reasonable and just to tax land values imparted by free travel to pay for the same. If the principle is correct that land values created by the public expenditure should be taxed to recompense the public for the expenditure, it then follows that the cost of constructing roads and streets and sewers and keeping them in order, the expenses of lighting, planting of trees, &c., &c., should be paid for out of the so-called unearned increment upon land which arises on account of public expenditure and the neighbourhood of a civilised community. The taxation of the unearned increment imparted to land by the community would

reduce the selling price of land and thus remove this difficulty. It would also make rates and taxes upon houses and improvements unnecessary, and thus remove the third difficulty. In fact, it would exempt industry entirely from taxation.

Finally the increased employment of labour would advance wages. The transfer of taxation from industry to unearned increment would be of the greatest benefit to the working classes. It would make unprofitable the holding of land out of use, and would at the same time exempt improvements on land from taxation.

The Sanitary Registration of Dwellings in regard to Drainage and Water-Supply.

BY

H. RUTHERFURD, Barrister-at-Law, Delegate from the Sanitary Assurance Association.

The purpose of this paper is to enforce the view that all dwellings hereafter to be built, and certain classes of dwellings already erected, should be provided—1. With a system of house drainage so arranged and constructed as to guard the inmates from the noxious influence of so-called sanitary appliances: 2. With a protected indoor water-supply, as distinguished from a wholesome supply at the fountain head: and 3. That the dwellings referred to, when so provided, and on production of a sanitary certificate, granted by a competent authority, shall be entered in some official Register.

It cannot be denied that the existing legislative provisions as to *house drainage and water-supply protection* are insufficient to maintain the degree of safety necessary for preserving health; and although other matters appertaining to house sanitation deserve consideration, the two subjects mentioned demand *urgent* attention, and ought to be dealt with more effectively by competent authority. While adequate ventilation of a house, inodorous surroundings, and other matters, are of considerable importance, many of these are largely dealt with by existing law. Further, there is this marked difference between some of these useful requirements and those specially pressed by this paper. Bad ventilation and ill-placed dustbins are *obvious* defects; the purchaser or hirer of a house cannot say that he is misled or deceived, and the maxim "*caveat emptor*" applies. But with regard to faulty arrangements in the domestic closets and waste-pipes, and defective or ill-contrived water-cisterns, the case is different. The offending point may be discoverable only by the observing power of an expert, or may be concealed from every one until revealed by illness, or by the breaking up of a building. The mischief is insidious, and as the emanations from sewer connexions are of serious consequence to inmates of dwellings, it seems only reasonable to draw a distinction between the

high standard may lead to immediate failure, and possibly to a disastrous postponement. On the other hand, there can be no doubt that if by the limited scheme here presented dwellings should be provided with appliances of the character specified, examined in their respective positions, and periodically supervised, a great improvement would be conferred upon the habitations of the people. Slow and lingering diseases would be diminished, the tone of the general health would be raised, and something would have been done to increase the happiness of many an individual home.

DISCUSSION.

Dr. Pankhurst (Manchester) said that the Corporation of Manchester had set a good example by applying the Housing of the Working Classes Act to a large area. In applying the powers of the statute difficulties arose, because no place was so bad as not to find some persons willing to live in it. All great cities had insanitary areas. Another difficulty was the cost of acquiring land. Before these difficulties could be overcome administrators must be backed by a greater force of public opinion. He suggested that when an area is cleared, part of it should be covered with model dwellings at nominal rents, but under rigorous rules as to discipline. The worst class of tenants might submit to the discipline if they only paid nominal rents. The remainder of the area should be put up to competition under sanitary restrictions, submission to which might be induced by removing pecuniary burdens. The model dwellings would be imitated in other places, both in construction and organisation. Thus healthy homes would gradually replace existing insanitary houses; the working population living in them would develop increased powers for hard work; their lives would be lifted into a higher condition of independence and morality, on which could be engrafted the excellencies and graces of life.

Dr. Parkes (London) said the working classes largely depend on local sanitary authorities for healthy homes. A certain amount of centralization was necessary to control local boards. The controlling authority should be a county council cognisant of local needs rather than a Government department ignorant of them, and likely to regard everything as a matter of numbers and figures to be dealt with according to strict departmental rules. All houses occupied by members of more than one family should be regularly and systematically inspected. This was seldom done because local authorities had not a sufficient number of sanitary inspectors. The courts administering sanitary law should be separate and distinct from police courts administering criminal law, the decisions of which were often unsatisfactory. In London dilapidated houses, when pulled down, were often replaced by huge blocks, where large numbers were crowded into a small space in rooms some of which were shut off from light and air. The Metropolitan Building Acts were insufficient to prevent the erection of these insanitary buildings, which future generations would find very difficult to deal with effectually. The poor population who were driven out from the central districts of London had crowded into badly built houses in the suburbs, and these in a few years would be as bad as those from which the people came. Present powers

were insufficient to remedy this evil, which has only been shifted, not destroyed.

Mrs. Sheldon Amos (London) pointed out that the London County Council had decided that blocks of houses should not exceed four stories in height. The difficulty in housing the very poor was increased by their own conduct. Placed in decent houses, they often used the woodwork for fuel, and even tore up the stairs. She thought that medical officers of health were not always reliable.

Mr. Mark Judge (London) deprecated too much dependence on officialism, but approved Mr. Rutherford's proposals for the sanitary registration of houses. The system should be applied to all houses, not merely to those of the working classes. Most new houses are erected under the supervision of sanitary officials; old houses are examined by them and sometimes demolished by their direction. The results of their supervision should be recorded. Owners and occupiers complying with their requirements should receive a certificate to that effect. This would protect them against the officials and against changes in the standard of official requirements. The State should see that owners or occupiers properly attended to the sanitary condition of their houses, but the State should not undertake to regulate the sanitary arrangements of every household. This would remove individual responsibility, stereotype imperfect systems, encumber private enterprise, and discourage inventive activity. The sanitary registration of dwellings should be effected on certificates of competent sanitary experts, not on certificates from public officials.

Mr. Alexander (London) considered that some of the so-called model dwellings were wanting in many of the provisions necessary for home and family life. He agreed that medical officers of health should be protected in the discharge of their duties, and thought protection should also be given to sanitary inspectors.

Dr. Elgin Gould (Washington, U.S.A.) in reply, said that many of the difficulties suggested had been solved in the United States, and he suggested study of the recent sanitary laws and regulations in force in New York. He strongly urged the importance of regular systematic inspections by the sanitary officials instead of waiting for private complaints, and he advocated registration and certification of houses. In New York only a certain portion of a plot could be built upon, and the height of the building was regulated in proportion to the width of the street. Plumbing had to be certified as satisfactory before water could be turned on. The presence of a janitor in all tenemented houses tended to prevent tenants from tearing up woodwork for fuel.

The Present State of British Law Controlling the Discharge of Noxious Gases from Manufacturing Processes.

BY

A. E. Fletcher, F.I.C., F.C.S., H.M.'s Chief Inspector under the Alkali, &c. Act.

Owing to the great development of manufacturing industry, in recent times, injury to the air has been more and more felt, and especially in districts where are carried on certain chemical trades from which large

volumes of noxious gases are liable to be discharged, gases which are poisonous either to animal or to vegetable life, or to both.

Among such processes may be mentioned those required for the separation of metals from their ores; the preparation of soda, potash, or the alkaline earths from their components, as found in nature; the treatment to which animal and vegetable fibres are subjected to prepare them for the various uses to which they are applied; the preparation of colouring materials; these, and a thousand other operations which are needed for the production of the countless articles considered necessary to the carrying on of our modern civilised life. In the preparation of many of these a noxious gas forms part of the manufacture, and there is therefore a liability of its escaping into the air. We are greatly dependent on the products of chemical industry for the enjoyment of our daily life, and we cannot afford to stop such manufactures, except in extreme cases, even though they may be the occasion of some amount of pollution to the air around us.

It is recorded that in 1316, in order to purify the air, an edict was passed prohibiting the burning of sea-borne, or bituminous, coal in London, on pain to the offender of having his house pulled down. Modern legislation on air pollution, however, seeks to regulate the offending manufacture, rather than to suppress it. From ancient times rules have been adopted in various localities for regulating certain trades from which noxious exhalations were to be expected; but the first distinct Act of our Legislature which attempted to control the emission of noxious gases from chemical manufactures was the Alkali Act of 1863. And, as far as I can learn, this was the first legislative Act of the kind in Europe regulating, but not suppressing, the emission of noxious gases from a manufacturing process.

The Alkali Act of 1863 referred to only one noxious gas. Its special object was to restrain manufacturers of soda from common salt from allowing the hydrochloric acid generated by the Leblanc soda process to escape as a gas into the air. This acid was, up to that time, considered mainly as a waste product, to be got rid of as easily as possible. With this object, it was allowed to enter the smoke-flues and pass up the main chimney of the works. In fine, dry weather the acid was carried far away from the factory, and becoming largely diluted with air, inflicted but little perceivable injury on distant vegetation. Generally, however, the moisture in the atmosphere promoted the condensation of the gas; it was carried down by the rain and caused severe injury to neighbouring plants of all kinds. Trees up to three miles from the works were sometimes denuded of their leaves, and, in a short time, killed; those at even greater distances were injured. The Alkali Act of 1863 made no attempt to stop the soda manufacture, or diminish the activity of the trade, but, in the belief that hydrochloric acid gas could be condensed, and its passage into the air arrested, it enacted that only a certain proportion of the acid generated should be allowed to escape into the air. This amount was fixed at 5 per cent., or one-twentieth part, of the quantity made. It is difficult to know on what

ground the figure 5 was chosen. In adopting it, the moderation of the legislature has been abundantly justified, for, at present, of all the hydrochloric acid generated in Great Britain and Ireland, rather more than 98 per cent. is condensed, while less than 2 per cent. is allowed to escape.

In the Act of 1863 a second new departure was made. This was the appointment of inspectors with power to enter factories and ascertain, at all times, whether the provisions of the Act were duly carried out. Hitherto the common law was the only remedy to which appeal could be made in cases where damage had been done by the emission of noxious gases into the air. But it was found insufficient, because no adequate restitution could be made in many of the cases where injury was sustained, and because, where several chemical works closely adjoined each other, there was great difficulty in determining which had been the offender.

In many cases a money payment could not possibly compensate for damage done. The growing crops on a farm doubtless have a money value, and when destroyed can be paid for in money, but who shall attempt to compensate the owner of an ancestral estate, an ancient hall surrounded by spreading elms and beech, and oaks of centuries' growth, commanding an extensive view of wooded hill and valley, by paying him the timber value for those trees when destroyed by the acid blast of a chemical work. It is clear that in such a case protection from injury is required, not compensation for injury done. Again, at Widnes, in Lancashire, there are 18 large chemical works closely adjoining one another, all capable of doing similar damage to neighbouring vegetation. It is clear that a farmer whose crops at half a mile distance had suffered injury would find it impossible to ascertain which of the 18 works, or how many of them, had been the authors of the mischief. In a twofold manner, therefore, the common law was found insufficient to afford adequate protection in the cases described. Hence the necessity for the new departure in the Act of 1863. It might have been feared that the inspector of chemical works would be regarded by the manufacturer as a spy, a most unwelcome intruder. This has not been the case. Thanks to the wise method of the first chief inspector, Dr. R. Angus Smith, and the discretion of those who held office under him, their visits have rather been courted than resented. The best of the manufacturers regarded the tests made by the inspector as an additional guard of their interests, a further check upon the correct working of their establishments. The smaller men found that the improvements they were led to make in their apparatus in order to comply with the requirements of the Alkali Act, and the increased care demanded in the manipulations of their operatives led to generally improved working and increased profits. The effort of the inspectors has been to induce the manufacturers to make constant systematic tests themselves of the condition and com position of the waste gases of their works, and not to wait till the inspector's test should show that there was an infringement of the provisions of the Act. The result has been very marked. Whereas in the old time any effort to ascertain the composition of waste gases was

almost unknown, now in all suitable cases gas testing is carried out not only by skilled chemists, but as a matter of routine by the workmen themselves. It may also be fairly claimed as a useful result of action taken by the legislature in compelling the manufacturers to prevent the escape of acid gases by their condensation or otherwise, that in so doing, they have been more able to stand their ground against the opposition brought by rival processes. The primary object of the Alkali Act was to compel the alkali manufacturers to condense at least 95 per cent. of the hydrochloric acid they made. This acid was then considered to be in great measure a waste product. Now it is the main source of profit to those who continue to work the Leblanc soda process. Owing to the introduction of a cheaper method for the production of soda, and its consequent reduction in price, the makers by the older method lose on every ton of alkali they sell, but as by the newer process no chlorine compounds are produced, the older makers recoup their loss, and retain their financial position by the sale of these, which are the derivatives of that hydrochloric acid which it has been the object of the Alkali Act to oblige them to conserve. It may thus be asserted that the result of the Alkali Act has been, firstly, to diminish greatly the escape of noxious gases into the air to the injury of vegetation and of animal life and human health; secondly, to assist the manufacturer in controlling his processes of manufacture; and, thirdly, to aid in educating the workmen by leading them on to habits of precision and careful attention to detail. It was soon seen, however, that though five per cent. of the acid generated in a small work, and well mixed with air might be comparatively harmless to the surrounding country, yet the same proportion of that produced in a large work might be very destructive. Moreover, whether the initial quantity were large or small, the condensation went on with ease until the last portions were reached. The difficulty increased as the residue became smaller, not in relation to the original amount, but to the residual air with which it was mixed. In other words, the irreducible residue should be described, not as so much per cent. of the quantity first operated on, but as being a certain fraction of the bulk of air mixed with it. Experiments made in this direction showed that it was not difficult to reduce the amount of hydrochloric acid escaping in the chimney gases of an alkali work to two-tenths of a grain in every cubic foot of such gases. In the year 1874 an amended Act was passed, requiring not only that 95 per cent. of the hydrochloric acid gas must be condensed and arrested, but also that condensation must go on until not more than two-tenths of a grain of that acid should be contained in a cubic foot of the air or gases finally emitted. Further it was enacted that the best practicable means must be adopted for arresting all other noxious gases given off in the work. No standard is here given of the extent to which this condensation must be carried, but attention is fixed on the means used, which must be the "best practicable." The importance of this clause cannot be overrated, and though it may at first sight be regarded as less precise and binding than a fixed standard, such as formed the basis of the older Act, yet in practice it is found to be all that

can be desired and far more comprehensive than any numerical standard. A numerical and fixed standard, though tight and difficult of maintenance to-day, may to-morrow be slack and insufficient in consequence of the introduction of new methods of manufacture, or greater skill of manipulation. It has been so both with the five per cent. and the two-tenth standards; the average amount of hydrochloric acid now discharged from all the chemical works of the country is less than two per cent., while the fixed limit is five per cent., and less than one-tenth of a grain per cubic foot, while the legal limit is two-tenths. The obligation, however, that a man must use the best practicable means for preventing the escape of noxious gases into the air is an ever-tightening bond, accommodating itself to the varying conditions of the problem. Nor is it a bond which can become too tight or oppressive, for who can deny his obligation to use the best practicable methods for accomplishing the objects in view? Moreover it cannot be made oppressive by the whim of an inspector, for in conducting a prosecution under the Act, the onus rests on him to show that better and more practicable means for accomplishing the end in view exist. His assertion, too, must be maintained to the satisfaction of judge and jury in open court, in face of the defendant's skilled witnesses.

To this point the Alkali Act had reference only to the hydrochloric acid and other noxious gases liable to be discharged from alkali works. It was, however, recognised that these were not the only works from which acid and other noxious gases might escape. In 1881 a new Act was passed superseding those of 1863 and 1874. In this the main provision of the older Acts were retained as regards alkali works, but a number of other works were included, from which the more commonly known noxious gases are liable to be emitted. The works now for the first time included were: Sulphuric acid works, chemical manure works, gas liquor works, nitric acid works, sulphate and muriate of ammonia works, chlorine or bleaching powder works, cement works, and salt works. This has caused a great addition to the number of the works originally brought under inspection. The number of registered alkali works in 1890 in Great Britain and Ireland, was 133, while there are 901 other works registered under the Act.

It is obvious that no list of chemical manufactures can long be complete. Almost before the ink with which it is written has become dry, some new process has been proposed, and yearly, if not almost daily, we need to make additions if the list is to include all. At present an extended schedule has been drawn up, enumerating six new kinds of chemical works which it is thought should be added to the list of those which now come under inspection, and constantly further additions might be made as new processes are brought out.

The difficulty thus found of keeping pace with invention arises from the assumed necessity of enumerating the processes of manufacture which are brought under the provisions of the Act. The same difficulty would not arise if instead of naming the *processes* a list were made of the *substances* which are considered noxious, and whose emission is to be kept in check. The Act indeed need take no cognisance of the

manufacture if only control be kept over the substances liable to be discharged from it. These noxious volatile substances or gases are not numerous. The following list of eight will be found to include all that are commonly met with: the acid compounds of chlorine, of fluorine, of sulphur, and of nitrogen, chlorine, sulphuretted hydrogen, metallic fumes containing lead, antimony, arsenic, or zinc, and dust or visible fume, as that from cement works.

A Noxious Gases Act, with such a schedule, would be found to include all the works now under the Alkali Act and all works of a similar nature liable to be established. Nor would it be necessary to fix a numerical limit of the amount of each substance that may be discharged into the air; it would be sufficient to enact that the best means must be adopted to prevent such emission. Perhaps one ground for avoiding this comprehensive classification of noxious gases, and for continuing the effort to name separately every manufacturing process from which such gases might emanate, has been the necessity of charging an annual registration fee on the owner of every work coming within the purview of the Act. The difficulty, however, exists perhaps more in the legal mind than would be found in practice, and the necessity of exacting a registration fee, on which the difficulty rests, has been disputed by many.

It is now 28 years since the passing of the original Alkali Act, and it may be said that the experience of its working has fully borne out the intentions of its framers. For the purpose of its administration the country is divided into seven districts, each being in charge of an inspector. The whole staff being under the superintendence of a chief inspector. It has been found necessary to institute but few prosecutions for contraventions of the provisions of the Act, the effort being to prevent such infractions by activity on the part of the inspectors. No notice is given of their visits, which may be made either by day or night.

If experience has shown the necessity for any amendment in the Act it is only in the direction already indicated, namely, that of rendering the schedule of works which come within its scope more comprehensive by naming the noxious gases which it is desired to control, rather than by specifying the processes of manufacture in connexion with which these gases are liable to be emitted.

Les Falsifications des Produits commerciaux et les Mesures internationales pour leur Répression.

PAR

Le Dr. P. F. van Hamel Roos, (Amsterdam.)

Voici ma première thèse :—

1°. *Il y a lieu—eu égard aux falsifications observées dans les divers pays—d'exprimer le vœu qu'il s'établisse une entente internationale visant la répression des falsifications des articles commerciaux en général.*

Tout le monde est d'accord que les gouvernements doivent s'entr'aider pour la répression des fraudes ; on a discuté cette question au Congrès de la Haye, de Bruxelles et de Vienne, et néanmoins, tout convaincu que l'on soit de la nécessité de cette entente internationale, tout bienveillant que l'on soit dans les différents Congrès pour se promettre une aide réciproque—rien ne se crée par rapport à cette question si importante.

Il serait injuste de ne pas reconnaître que des lois ont été promulguées pour la répression *nationale* des falsifications, depuis que les Congrès ont fixé l'attention sur ce point, et la " Revue internationale des Falsifications " que je dirige, prouve ce qui depuis bientôt cinq ans a été fait dans cette voie. Mais en lisant cette même Revue on doit se dire : comment se peut-il, qu'il y ait presque partout des lois sévères contre les fraudes alimentaires et que pourtant il y ait tous les mois des falsifications observées, soit en Amérique, ou en France, ou en Allemagne, ou en Italie, etc. etc. ?

Au Congrès de Vienne, où j'avais l'honneur de traiter aussi le sujet des falsifications, j'ai comparé les produits falsifiés aux pauvres Bohémiens dont personne ne voulait dans son propre pays, mais que les divers gouvernements essayaient d'envoyer aux frontières voisines. Je crois qu'une grande partie des falsifications résultent de tels envois réciproques—non par les gouvernements bien entendu !—mais par les commerçants malhonnêtes qui se garderaient bien de vendre leurs produits malsains dans leurs propres pays, vu les lois, mais qui sont très peu soucieux s'il s'agit de la santé des étrangers et qui ne se gênent pas, même d'empoisonner quelquefois lentement les gens qui ont le malheur de se trouver hors leurs frontières. Il va sans dire qu'il y a en outre malheureusement encore assez de falsificateurs de profession qui, non contents du gain illicite des exportations, tâchent de faire écouler leurs produits dans leur pays même. L'audace de ces fraudeurs est quelquefois sans pareille et ils essayent tout pour dérouter les chimistes et experts. En voici un exemple. Il se présenta, il y a quelque temps, un soi-disant " fabricant " de farine que me dit, être la dupe de mauvaises pratiques de concurrents qui prétendaient que sa farine était falsifiée. Il me donna un échantillon qu'il avait préparé lui-même—donc il était sûr qu'il n'y avait que du froment dedans, ce qu'il voulait prouver par

mon analyse. Mon examen démontra qu'il y avait de la farine de riz en grande quantité. *Le falsificateur n'avait pas crû que l'examen pourrait déceler la farine de riz* et la prétendue mauvaise pratique et la sûreté qu'il donnait de l'avoir fabriqué lui-même, n'étaient qu'un prétexte pour dépister le chimiste ! Mais en dehors des cas de falsifications dont la base est le gain illicite, mon expérience, assez longue dans la matière, m'a fait connaître des faits qui n'ont rien à faire avec la fraude et qu'il est extrêment important de citer, puisqu'il s'agit de la protection du commerce honnête. Cette question m'amène à ma seconde proposition :

2° *Il est désirable que les divers gouvernements fassent rédiger un code indiquant la composition normale des articles commerciaux en général et des substances alimentaires en particulier. Ce code devrait dans chaque pays servir de base aux jugements pour cause de falsification. Les divers gouvernements s'obligeraient à se tenir au courant de ces codes et des changements qu'il serait nécessaire d'y apporter.*

Quelques exemples suffiront pour démontrer la nécessité absolue de cette mesure. Prenons le lait : Le lait qui est considéré en Hollande comme suffisant quand il renferme 11·5 % de matières solides et 2·5 % de graisse, est jugé falsifié aux États-Unis qui n'acceptent que 12 à 13 % (selon la saison) de matières solides et 3 % de graisse. Le vin qui contient plus de 2 gr. de sulfate de potasse par litre est considéré come falsifié en France, tandis qu'il y a à l'etranger des vins à plus de 2 gr. qui ne sont pas refusés. Je pourrais citer encore le beurre concernant la teneur en eau, caséine et sel ; le chocolat concernant sa teneur en fécule, en sels inorganiques (potasse) et en sucre ; le poivre, etc. ; mais je crois que ces exemples suffisent pour démontrer qu'un marchand honnête, en exportant les marchandises jugées normales dans son pays, peut s'exposer au danger de la confiscation de ses marchandises et risquer son honneur en exportant dans les pays, où les vues des chimistes sont autres que dans le sien.

Si un *Codex alimentarius*, rédigé par une Commission compétente et dûment élue par les divers gouvernements, était adopté dans tous les pays, ces faits—déplorables sous tous les rapports—seraient tout à fait impossibles, puisque les marchands pourraient se convaincre d'abord si telle ou telle marchandise serait acceptée ou non dans le pays en question. Ces commissions auraient, il est vrai, une tâche très difficile, mais pourtant il me paraît que leur travail pourrait être facilité d'une manière considérable, en profitant des analyses de tant de produits déjà publiées de chimistes compétents. Quant à l'organisation d'une telle commission, je crois qu'elle devrait être composée en partie de chimistes de médecins, de juristes et d'ingénieurs. S'il y avait lieu on pourrait demander l'avis de fabricants sérieux des différents produits pour rester dans les limites de l'équité envers l'industrie. J'ai proposé au Congrès de Vienne l'institution de laboratoires, soit aux frontières, soit aux docks pour la répression des fraudes. Mais guidé par mon expérience des dernières années, je crois que cette mesure, *la seule que je considère efficace*, doit être *précédée* de la composition du dit code que chaque

nation pourrait rédiger selon ses propres idées et les circonstances locales qui, sans aucun doute, ont une grande influence sur la composition des produits. Il va sans dire que ce code pourrait être amendé et additionné, s'il y avait lieu.

L'idée d'une tel code a été émise déjà en 1876 par le Conseil supérieur d'Hygiène en Belgique " qui a recommandé la rédaction d'une " instruction devant servir de guide aux administrations communales, et " indiquant à la fois la composition normale des substances alimentaires " et les moyens les plus faciles pour en constater l'altération et la falsifi- " cation."* Ma proposition tend à généraliser cette idée pour tous les peuples, afin de servir vraiment de base à une entente internationale efficace, mais sans prescrire aux savants les méthodes, puisque je considère le vrai principe libéral dans la science : respecter toutes les opinions sérieuses et basées sur des faits bien constatés.

DISCUSSION.

Dr. Abbott (Boston, U.S.A.) said that the law which regulated offensive trades in Massachusetts dated from 1697, but had been amended from time to time. The duty of enforcing it devolved primarily on the local authorities, but if they failed to act the State Board could proceed independently. The first object of the law was to assign places where offensive trades could be carried on. The present law of Massachusetts relating to food and drugs dated from 1882. Samples were examined by the State Board. The law required that three-fifths of the appropriation of $11,500 (£2,300) should be spent in enforcing the law relating to milk and milk products. The principal articles (besides milk and butter) found to be falsified were spices, syrups, honey, cream of tartar, vinegar, molasses, and maple sugar and its syrup. Most of these were commercial frauds, not harmful adulterations.

The Extent to which the State should exercise Control in the Interest of Public Health over the Sale of Poisons.

BY

G. Danford Thomas, M.D., Coroner for London and Middlesex.

On reference to the Report of the Registrar-General for 1889, I find that 15,025 persons died during the year from what are termed violent deaths, and that of this number 636 were from the effects of poison; excluding authentic cases of suicide, which number 260, there are left 376 cases of death arising from poison, classified as occurring from accident or negligence. The various poisons recorded as causing these deaths were arsenic, mercury, lead, copper, lunar caustic,

* Voir Revue internationale des falsifications (Amsterdam) 2e Année, p. 194, article de M. D. A. van Bastelaer.

ammonia, caustic soda, caustic potash, phosphorous, sulphuric acid, nitric acid, hydrochloric acid, carbolic acid, carbonic acid, turpentine, paraffine, opium, laudanum, morphia, cordial, soothing syrup, paregoric, chlorodyne, alcohol, chloral, atropine, belladonna, iodine, prussic acid, oil of almonds, cyanide of potassium, aconite, colchicum, strychnia, nux-vomica, cocaine, antipyrine, Steedman's powders, and Burnett's disinfectant; and besides these, a few deaths were attributed to the eating of fungi, poisonous weeds, and poisonous fish.

The records of the coroner's court would reveal, in detail, exactly how and under what circumstances these deaths occurred, and how, when, and where, and in what form the particular poison causing each death was obtained and taken. Such records are well known to medical men, and, therefore, unnecessary to be repeated in detail here. Most of these poisons have been taken in mistake for something else, or taken as overdoses of medical preparations the dangerous contents of which were unknown to the consumers. Despite the regulations and precautions which, to a certain extent, are imposed in this country by law on the sale of poisons, the would-be suicide manages to obtain what he wants in one way or another, and even, indeed, if effectually hindered in this method of self-destruction, would readily find some other means to accomplish his object. But, as I have mentioned, the larger number of deaths from poisons are classified as from "misadventure"—using the word as opposed to a suicide or the wilful act of some other person. In some instances, "neglect," not necessarily of a criminal character, may rightly be attributed, either to the deceased person himself, or to the careless act of someone else. In the same year (1889) 63 deaths occurred where the kind of poison was not stated. As far as the large majority of *deaths* from poison is concerned, we can obtain fairly reliable facts and statistics; but it is impossible to even estimate the large number of persons who may suffer either from acute or chronic poisoning, who may recover or who do not die from the immediate effects of the poisonous drug. Hospital records would reveal a considerable number, but to this must be added those which every medical man in practice encounters from time to time.

It is well known that some of the poisons in the list I have given are contained in many of the proprietary and so-called patent medicines and nostrums, which are largely sold to the public, who procure and consume them without any knowledge of what they contain. It is true that, on analysis, many of these are found to contain harmless ingredients, but a large number of them contain "concealed poisons," such as morphia and the various preparations of opium, prussic acid, antimony, and other poisonous drugs as found in chlorodyne, black drop, soothing syrups, some balsams and elixirs, teething powders, &c. Even in so-called blood mixtures, arsenic and iodine of potassium have been discovered in quantities capable of producing poisonous results. Dr. Hubbard, in his excellent pamphlet on "Homicide as a Misadventure," says, "Disasters not inaptly termed "runaway knocks at death's door" are constantly occurring, the most frequent of which is profound coma for many hours. These have no public register; they are only recorded

on the "tablet of the memory" of the members of the family in which "they occur, and in the diaries of medical men."

Having briefly referred to the deaths and cases of poisoning that arise, in so many instances, from preventible causes, I would draw attention to the sources from which these poisons are obtained, and the facility with which many of these are sold and purchased; and then, after mentioning the existing regulations affecting the sale of poisons in their naked and concealed forms, as permitted in England, I will endeavour to suggest what further regulations might, with advantage, be adopted in this country as a means of lessening the mortality from poisoning, and reducing the dangers to health and life, which now exist from the indiscriminate sale of proprietary and other medicines containing "concealed poisons." There are three Acts of Parliament regulating the sale of poisons. The Arsenic Act, 1851, and two Pharmacy Acts, 1852 and 1868 respectively. These Pharmacy Acts contain two schedules of poisons, and when a poison contained in either schedule is sold, it must be labelled with: — 1. Name of article. 2. The word "poison." 3. The name and address of the seller; and, in addition to this, when any poison in Schedule I. is sold, there must be an entry made in the poison book as to: 1. Date of sale. 2. Name and address of purchaser. 3. Name and quantity of article. 4. Purpose for which it is wanted; and further, it is not to be sold unless the purchaser is known to, or introduced by, some person known to the seller. The following are the lists of the poisons contained in the schedules referred to:—

Schedules of Poisons.

Part I.

Arsenic, and its preparations; aconite, and its preparations. Alkaloids:—all poisonous vegetable alkaloids and their salts; atropine, and its preparations; cantharides; corrosive sublimate; cyanide of potassium, and all metallic cyanides and their preparations; emetic tartar; ergot of rye, and its preparations; prussic acid, and its preparations; savin, and its oil; strychnine, and its preparations; vermin killers, if containing poisons.

Part II.

Almonds, essential oil of (unless deprived of prussic acid); belladonna, and its preparations; cantharides, tincture, and all vesicating liquid preparations of; chloroform; chloral hydrate, and its preparations; corrosive sublimate, preparations of; morphia, preparations of; nux-vomica, and its preparations; opium, and its preparations; and preparations of poppies. Oxalic acid; precipitate, red (red oxide of mercury); precipitate white (ammoniated mercury); vermin killers, containing poisons as in schedule.

Now it will at once be seen that there are a large number of poisons not included in the above lists, and these can be purchased without restrictions from anyone who likes to sell them. For example, carbolic acid, nitric acid, hydrochloric acid, sulphuric acid, phosphorous (as rat

poison), can be procured at most chandlers' and oil shops, from one pennyworth upwards, by any person, of any age; and they can be sold, and often are, in any kind of vessel—ginger-beer bottle or teacup—without cork, label, or indication of any kind as to the nature of the contents. Poisons bought in this way cause a large number of the deaths from poisoning, classified under the headings of misadventure and suicide. I should mention that the wholesale dealers are exempt from the operation of these Acts, so that any quantity of poisons could be procured through them without restrictions. A photographer told me that he had only to send his boy to the wholesale house, and he could obtain as much cyanide of potassium as he wanted, without any difficulty. Besides then, the chemist and druggist, the chandler and oil-shop keepers, who sell poisons, there are about 13,600 tradesmen in Great Britain (other than those mentioned) consisting of grocers, linendrapers, general storekeepers, and others who are dealing in mysterious and secret medicines, many of them containing poisons, the nature and property of which are absolutely unknown to the vendors. In the year 1888 there were in Great Britain 21,600 licences taken out for the sale of patent and proprietary medicines. Comparatively speaking, there are very few *patent* medicines. The composition of a really *patent* medicine is known, and can be seen at the Patent Office. The *proprietary* medicine is a secret preparation, and hence preferred by the owner; but both bear Inland Revenue stamps, and are vaguely termed by the public "patent medicines." Over 200,000*l.* was realised by the Government last year from the sale of medicine stamps, and about 6,000*l.* for licences to sell. These figures will give some idea of the extent of the sale which takes place annually in Great Britain, in secret remedies, and it is also a painful record of what charlatanism and quackery are able to achieve in this so-called enlightened age. How far, then, should the State interfere as regards the health of the people in the sale of poisons, and of secret medicines containing poisons? In making regulations, care has been taken not to hamper the requirements of trade, and, bearing this in mind, I would respectfully submit that even if much stricter regulations were enforced, the purchaser, whether wholesale or retail, would not be subject to one-half the restrictions he has to submit to if he desires to remove a cask of wine or spirits from a bonded warehouse at the Docks.

As an amendment to the Pharmacy Acts I would remove such poisons as morphia, laudanum, chloroform, nux vomica, belladonna, and chloral-hydrate, corrosive sublimate, from the second to the first list of poisons, and all those poisons already mentioned that can be procured at the oil-shops should at once be placed in List No. 2, so as to ensure their being properly labelled as directed by the Act. I would further make it compulsory that all such liquid poisons should be sold in a distinctively coloured bottle, and that no one under the age of 16 years should be served at all. Such regulations would inflict hardship upon no one. With regard to the sale of proprietary and secret medicines containing poisonous drugs, I would have the contents clearly expressed on the label, and the word poison added as required in the sale of such poisons under the present Acts.

Let us see what the Japanese are doing in this matter. They have established a public laboratory for the analysis of chemicals and patent medicines. The proprietors are bound to supply a sample, with the names and proportions of the ingredients, directions for its use, and an explanation of the supposed efficacy. During the year 1889 there were no fewer than 11,904 applicants for licences to prepare and sell 148,091 patent and secret medicines. Permission for the sale of 58,638 different kinds was granted, 8,592 were prohibited, 9,918 were ordered to be discountenanced, and 70,943 remained still to be reported on. The majority of those authorised to be sold were of no efficacy, and but few were really remedial agents. The sale of these was not prohibited, as they were not dangerous to the health of the people.

In *Italy*, only as recently as January 1st of the present year, the sale of secret remedies became subject to the following regulations:—The composition, as to the quality and quantity of the active substances contained must be written on the labels and on the advertisements; no special therapeutic virtue or indication shall be attributed to them either on the label or advertisement; they shall be sold only by chemists under the vigilance of the sanitary authorities and with medical prescriptions.

In *France* the pharmacier is forbidden to sell secret remedies or even to keep them on his premises under heavy penalties.

In *Germany* the chemist may sell patent medicines, when ordered by the prescription of the physician. He must not sell secret remedies. All patent medicines sold by the chemist must be prepared under special supervision, and according to the rules of the pharmacopœia.

In *America* the law varies in each State, but speaking generally much reform is needed.

Other nations seem in advance of Great Britain in the interests of the public health as regards the precautions taken in the sale of poisons and of secret medicines containing poisonous drugs. We might wisely in many respects follow their example.

I have one further suggestion to make as regards the sale of secret remedies. I would make all proprietary medicines really *patent*. I would abolish licences to sell them, and I would confine the sale to chemists and druggists only.

DISCUSSION.

Dr. Littlejohn said that from his long experience as surgeon of police in Edinburgh he concurred in the conclusions of Dr. Dunford Thomas, and cordially agreed that further legislation was necessary. He strongly disapproved of the unrestricted sale of laudanum among all classes of the community.

Brigade Surgeon McCann (delegate from the Government of Mysore, India) drew attention to the great loss of life occasioned by the unrestricted sale of poisons in India, and the total absence of any enactment to check this.

Mr. Carteighe (President of the Pharmaceutical Society of Great Britain) said that from his official position he had much information on

this subject, and in the public interest he cordially agreed with Dr. Danford Thomas's conclusions. The Pharmaceutical Society had found great difficulty in carrying out their powers under the Pharmacy Acts. There were so many ways of circumventing the Acts that it was often almost impossible to prevent the indiscriminate use of statutory poisons. Whilst pharmaceutical chemists only sold laudanum, &c. under certain conditions, a street huckster might sell any quantity if it were mixed with treacle or some other harmless material. Since the passing of the Act, the sale of statutory poisons had diminished, but that of quack medicines containing poison had increased enormously. It was well known to medical men that increased restrictions on the sale of alcohol were followed by an increased demand for nostrums containing poison, an additional reason why Dr. Danford Thomas's suggestions should receive the attention of the Government.

Dr. Danford Thomas proposed, and Dr. Littlejohn seconded, the following *Resolution*:—

"That in the opinion of this Section of the Seventh International Congress of Hygiene and Demography it is essential in the public interest that the existing law regulating the sale of poisons should be amended, and greater restrictions placed on the sale of poisons generally in all countries, and especially in Great Britain, India, and the British Colonies."

This was *carried* with one dissentient.

Thursday, 13th August 1891.

The Chair was occupied successively by—
Dr. F. W. Barry (London), and
Dr. Thorne Thorne (London).

On recent Proposals relating to Burial and Cremation, and the Importance of Disinfecting all Bodies Dying from Infectious Disease; with Remarks on the Present System of Certifying the Cause of Death.

BY

Sir Hy. Thompson, F.R.C.S., M.B. Lond., Consulting Surgeon to University College Hospital, Vice-President of the Sanitary Institute, Honorary Member of the French Society of Hygiene, and of the Royal Italian Society of Hygiene, &c., &c.

I propose to assume, in order not to occupy unnecessarily your valuable time, that there can be little or no difference of opinion regarding the accuracy of the following proposition:—

That the bodies of those who have recently died by any or almost any of the diseases generally known as "zymotic," and thus classified by the Registrar-General in this country, are charged with elements which have the property of communicating the same diseases to the bodies of living persons, if brought into contact with them, whether by inoculation or by food-admixture.

The group of diseases defined as "zymotic" is generally held to be formed chiefly by the following:—Small-pox, measles, scarlet fever, diphtheria, whooping-cough, typhus, enteric and continued fevers, with some forms of diarrhœa, and cholera.

In considering the mortality from these diseases, occurring under ordinary circumstances in this country, it will be desirable, first, to state what is the mortality arising from all causes, and then to ascertain the proportion which the group in question bears to the total.

The official reports of the Registrar-General for the last three years will show this, extracts having been prepared for the purpose. No special outbreak took place, and the average was rather lower than had previously been recorded.

The number of deaths from all causes in England and Wales during the last three years is as follows:—

Deaths in England and Wales during 1887, 530,758=18·8 per 1,000. [*Estimated population*, 28,247,151.] Among these, "zymotic," or specific febrile diseases, amounted to 75,205.

Of these 530,758 deaths, the causes of death were uncertified in 17,465 cases, or 3·3 per cent. (Fiftieth Annual Report of Registrar-General.—London: Eyre and Spottiswoode. 1888, pp. x, xii, xvi.)

Deaths in England and Wales during 1888, 510,971=17·8 per 1,000. [*Estimated population*, 28,628,804.] Among these, "zymotic," or specific febrile diseases, amounted to 60,166 cases.

Of these 510,971 deaths, the causes of death were uncertified in 15,747 cases, or 3·1 per cent. (Fifty-first Annual Report of the Registrar-General.—London: Eyre and Spottiswoode. 1889, pp. viii, x, xvii.)

Deaths in England and Wales during 1889, 518,353=17·9 per 1,000. [*Estimated population*, 29,015,613.] Among these "zymotic," or specific febrile disease, amounted to 69,776 cases.

Of these 518,353 deaths, the causes of death were uncertified in 15,100 cases, or 2·9 per cent., a smaller proportion than in any preceding year. In Wales it was larger than in any other locality, being 5·9 per cent. In Middlesex it was smallest, being only 0·7 per cent. (Fifty-second Annual Report of the Registrar-General.—London: Eyre and Spottiswoode. 1890, pp. viii, xviii, xix.)

Deaths in Scotland during 1888, 71,174=19·6 per 1,000; from zymotic diseases, 7,974.

Of these 71,174 deaths the causes of death were uncertified in 5,029 cases, or 7·1 per cent., but in very varying proportions in different localities.

Thus, in	Edinburgh, they were	10·1	per cent. of the total number.	
	Glasgow „	4·1	„	„
	Aberdeen „	1·6	„	„
	Greenock „	5·7	„	„
	Shetland (island of)	57·6	„	„
	Counties of Ross and Cromarty -	42·9	„	„
	Inverness they were	32·9	„	„
	Stirling „	4·9	„	„
	Dumbarton „	3·4	„	„
	Peebles „	2·2	„	„
	Selkirk „	1·9	„	„

(Thirty-fourth Annual Report of the Registrar-General in Scotland. —Edinburgh: Neill and Co. 1890, pp. XXVI and LVI.)

It thus appears that the mean mortality from zymotic diseases during the last three years amounts to 68,382 per annum in England and Wales alone. Of this large proportion, namely, more than one-eighth of the total mortality, it must be pointed out that each case was not merely a focus of infection while living, but was capable of actively propagating disease after death. At that period this activity is at its maximum; becoming less from various chemical changes which follow their natural course afterwards, largely, no doubt, through oxidation from exposure, the nature of some of these changes not having yet been completely studied and ascertained.

For the sake of the living and healthy population, the question of rendering those dead by zymotic diseases innocuous, is one of supreme importance. The nearly 69,000 foci of communicable disease scattered annually throughout our country cannot fail to extend injurious influences to others. It is not too much to say that this large number of deaths from maladies which are mostly preventible is itself partly due to the fact that the dead body is permitted to propagate disease to the living. Could we arrest at once and completely the injuriously active forces which pervade it, a marked diminution would be apparent in the progress of many a local pestilence.

Questions touching the isolation of cases during illness, their sanitary condition, and the employment of disinfectants during life, have hitherto largely occupied the public as well as the medical profession; and their study has been followed by remarkably successful results. Illustrations of these it will be wholly superfluous for me to adduce. The management of infectious disease during life is not within our scope to-day. The question here before us is,—"What is the best mode of arresting the progress of infection when death occurs, so that diseased remains shall not injure the living, whose right to protection is now the all-important consideration?"

A long experience has demonstrated that all methods of dealing with the dead body, which have for their object its conservation entire when it is charged with infectious elements, permit these to be disseminated, and have often occasioned fresh outbreaks, especially in periods of epidemic

visitation. The intricate, continuous, and universally pervading natural network of watercourse beneath the surface of the soil, associated as it is with innumerable artificial wells, reservoirs, and channels of every description for distributing water and collecting sewage, form a system unseen, yet scarcely imaginable in regard of its extent, by those who have not practically studied it and realised the complexity of its ramifications. In a densely populated country this system presents, perhaps, the most formidable social health problem which the sanitarian has to encounter.

The history of the chief epidemics of the last 60 years in this country, and of the local outbreaks of fever, diphtheria, scarlet fever, small-pox, &c., offer innumerable examples of propagation and extension of these diseases, due mainly, if not entirely, to the failure to prevent poisoning of the watercourses, not only by excreta during life, but by dead bodies committed to the soil:—bodies which are deposited there solely in obedience to a sentiment that it is necessary to preserve the integrity of their form and the unaltered condition of their elements;—elements at that moment so destructive and so mobile.

I have no need to dilate on these facts, their fatal influence is a part of our national history.

On the other hand, I shall not ignore the fact that diseased bodies may, in certain soils, in exceptionally favourable situations, be deposited with the object just named, and that in the course of three or four years, perhaps, the chief danger may be dissipated without ascertainable harm to others. Extreme precautions must always be taken to preserve the encroachment of population on these favoured spots, or no hope of their harmlessness can be maintained.

Then in these light, dry soils and elevated spots, the most salubrious, by the way, that we possess for human habitation (for which purpose, so long as they are used as burying-grounds, they are totally disqualified) it may be feasible to adopt interment in perishable coffins or in close contact with the soil itself, and thus to ensure a quicker process of decomposition of the body than occurs in heavier soil, or when it is confined in the more solid coffins hitherto employed.

But it ought never to be forgotten that the perishable coffin, if safe in exceptional circumstances, becomes most dangerous in burying-grounds where any communication exists with the great network of watercourses described, and always associated with populous districts. It is during the early weeks or months which follow death, that the poison of the diseased body is at its maximum, both as regards force and quantity. You open wide the doors for the exit of such infection when you bury that body in a basket or in a perishable envelope. Better even in the interest of the living that you placed it in the much abused lead coffin, offensive as the results of changes which take place in these sealed interiors are—when opened. For we have at least the right to doubt whether specific morbid germs survive for many years the remarkable organic transformation which slowly takes place within the lead coffin.

All, then, that I contend for is this: that, whatever form of dealing with the dead you adopt which demands as its primary condition the preservation of the body entire, some risk to the living is associated therewith. That risk may be minimised by certain precautions, but its amount is only a question of degree. It may be formidable, and produce lamentable results when interment is intra-mural—as many living witnesses can testify, since it was a custom not many years ago universally followed.

It is less considerable, but is often manifest, in confined suburban districts, and particularly where the central concourse of inhabitants is a rapidly increasing one.

The risk and its results are obvious in many country churchyards, especially in low-lying districts, on the borders of rivers and water-ways, —naturally, for manifold reasons, the favourite haunts of population. Such situations form, in fact, the sites occupied by the largest part of our rural inhabitants and by almost all our towns.

Finally, the risk is small when confined to outlying uninhabited districts with a peculiarly favourable soil. But who shall say when the minimum of risk at present there existing shall not in our populous country become manifestly greater?

Now in regard to the nearly 69,000 bodies dying of zymotic diseases, let it be observed that few of these are within reach of a choice and almost safe locality. On the contrary, they are scattered throughout the kingdom, and the majority are necessarily interred in places where the germs of disease can be readily carried into the currents of the great water systems referred to. With these existing facts before us, we have moreover to provide for an increasing population and for increasing occupation of the land best adapted for the purposes of habitation.

I have recently proposed therefore that the body of every person that has died of zymotic disease should be at once absolutely disinfected—rendered incapable of extending it,—that is, as soon as possible after death, having due regard to convenience and decorum.* I know only one mode of effecting this object, namely, by submitting the body to a sufficiently high temperature. Placed in a chamber heated to something like 1,500° F., about 800° C., all the fluid and gaseous matters are volatilised and escape as innocuous gases. The residue is a heap of dry white ash, absolutely harmless. An hour suffices to complete the operation, and it is in fact a process of complete desiccation and disinfection by heat. When the process is conducted in a furnace it is popularly spoken of as "Cremation." The method above described, however, constitutes the best and simplest way of accomplishing the end proposed, there being no contact with burning fuel or applied flame. I adopted it as an experiment for the first time as long ago as in 1874, by means of a Siemens' furnace, and thus reduced a body containing a large proportion of adipose tissue, and weighing about 110 kilogrammes, in less than an hour, the pure

* "Modern Cremation," 2nd edition: by Sir H. Thompson, pp. 126, 7.

white ashes weighing less than two-and-a-half kilogrammes.* The cost of the proper apparatus, and the necessity for a full supply of gas by which the heat is obtained, compelled the Cremation Society of England at first, following the example of the society at Milan, to employ a reverberatory furnace, the most approved form of which is now adopted at Woking, and with admirable results.† But the remarkable success which has followed the society's operations renders it probable that before long the system now referred to will also be in operation and conducted under their auspices.

It is this process of *disinfection by high temperature* that I now propose should be applied to all bodies certified to have died of infectious disease, as an act of wise precaution and just regard for the interests of the living.

There is one other course which might be followed, less trustworthy than the preceding, but infinitely more so than burial in the most favourable soil. This is the use of a capacious coffin, embedding the body therein with a large quantity of quicklime, so as to fill the receptacle completely, and then burying in the usual manner.

I now arrive at the latter and subordinate section of my paper, the subject arising necessarily and logically from what has gone before.

In contemplating the gradually increasing preference for cremation to burial which is being manifested, especially among the educated classes both in this country‡ and abroad, and particularly in view of the proposal to desiccate and disinfect by heat certain diseased bodies, which I advocate here to-day; it is essential to demand, at the same time, that the official determination of the causes of death should in all cases be more complete than it has hitherto been in this country. I refer you to the extracts from the Registrar-General's reports to show that in England and Wales some 15,000 deaths occur every year—about three per cent.—the causes of which have not been investigated or certified by any person. In Scotland the proportion is far larger. Even in the city of Edinburgh the uncertified deaths in the last report issued amounted to no less than 10 per cent.

Fully qualified medical men—a Medical Officer of Health, for example, is now to be found in almost every locality, with a district under his supervision—should be appointed so as to embrace the entire urban and country populations. His duty should be to examine and certify in every case of death, making an autopsy where desirable, determining whether a coroner's inquest is necessary, and certifying when he is

---

* Particulars were published in the "Contemporary Review," London, March 1874.

† There is now an excellent apparatus in full working at Père-la-Chaise, Paris, recently established: a furnace known as on the "Système Muller-Fichet." It is described in the "Journal d'Hygiène" for June 18 and 25, 1891.

‡ In 1885 cremation was first publicly performed at the Crematorium at Woking, and has been employed ever since with due precautions and solely under the supervision of the Cremation Society of England. Above 200 bodies have thus been successfully dealt with.

completely satisfied that death has occurred from natural causes. When this officer has thus certified, cremation is to be permissible. Lastly, he should advise, and in time may probably be empowered to enforce, after death by infectious disease, the use of quicklime, as above described, in districts without a crematory, or the process by heat where one exists.

In France, Germany, and other continental nations, an appointed examiner has long exercised the function described. In this country a certificate of death is given by the medical attendant of the deceased, if there be one. In many instances there is none; or the attendance has been insufficient to supply evidence of much value, and the duty is often discharged in a perfunctory manner unless a coroner's inquest is held, when the cause of death is carefully investigated.

I have said nothing relative to the employment of exposure to high temperature or cremation as a desirable process after death in *all cases*, instead of interment in earth. But it is impossible to resist the belief that the former would be preferable from a sanitary point of view. The argument which appears to me wholly irresistible in relation to bodies deceased from infectious diseases is only by some degrees less weighty in regard to death by all other causes. Putrefying animal matter is always noxious, and may be dangerous to the living; the process of desiccation and disinfection in earth must in any case occupy years for its accomplishment, and during the first period of the term much harm may arise. The unseen and lengthy process of putrefaction in the grave is one the details of which are too revolting to be illustrated by any verbal description. On the other hand the action of heat speedily converts the constituents of the body, healthy and diseased alike, into innocuous gases which escape without trace of smoke, odour, or offence, into the atmosphere, and into the white earthy ash already described. The atmosphere yields these gases at once to vegetable growths which increase by absorbing them.

Finally, by this means two great advantages are secured to the public.

First. A diseased dead body is rendered incapable of communicating any malady to the living.

Second. The assignment of large and desirable tracts of land throughout the country for the imperfect and sometimes hazardous process of purification by burial in earth is rendered needless. Every acre hitherto thus devoted may in process of time be made free for the production of food; or in thickly populated neighbourhoods, as open spaces for exercise and recreation, may be set apart for ever to promote and maintain the public health.

The Rational Disposal of the Dead: A Plea for Legislation.

BY

FRANCIS SEYMOUR HADEN, F.R.C.S., &c.

The object of this paper, I may say at once, is to contrast the safe and rational disposal of the dead prescribed to us by Nature with the unsafe and irrational method of burial which we practise, and with the equally unsafe and wholly unnecessary practice of cremation. Since, however, it is not possible to deal with so large a question within the short time at our disposal, I have no choice but, by a series of short propositions having a general bearing upon the subject, to present the case to you in its mere outline, and then, by such a reference to one or more of those propositions as time will permit, to found on that reference a plea for legislation. The propositions in question are:—

(1.) That the natural destination of all organized bodies that have lived, and that die on the earth's surface, is the earth.

(2.) That the evils which certain theorists would have us believe to be inseparable from the principle of interment, are independent of that principle and of our own creation.

(3.) That the source of these evils is to be found, not in the burial of the dead, but in the unreasoning sentiment which prompts us to keep them unburied as long as possible, and then to bury them in such a way that the earth can have no access to them.

(4.) That the principle of burial supposes the resolution of the body by the agency of the earth to which we commit it, and that the earth is competent to effect that resolution, and to effect it innocuously.

(5.) That to seek to prevent the beneficent agency of the earth by inclosing the dead in imperishable coffins, brick graves, and vaults, is in the highest degree irrational, since it engages us in a vain resistance to an inevitable dispensation, and has led us to accumulate in our midst a vast store of human remains in every stage and condition of decay.

(6.) That the remedy for such evils is not in cremation, but in a sensible recognition of, and a timely submission to, a well-defined law of Nature, and by legislative action to enforce the provisions of that law.

I propose to-day to deal with the fifth and sixth of these propositions only, and, that the connection of these two with the conclusions arrived at in this paper may be the more apparent, to remind you in the first place of the following facts:—1st. That so long ago as 1840, in consequence of the disclosures then made to them of the shocking state of the city graveyards,* the Government of that day issued a commission to enquire

* Walker on Graveyards. Longmans, 1839.

into and report upon the subject.* 2nd. That this commission, under the title of "The Board of Health," sat for 14 years, and that, by the end of the first three, it had examined into and reported upon the whole system of cemeterial management as carried out by ourselves and by the rest of Europe. 3rd. That although, in making that examination, it must have come under the notice of the members of this commission—and that again and again—that the coffins in use in every country but our own were of a comparatively light and perishable nature—mere orange boxes in fact in comparison with those we use—the fact, nevertheless, seems to have made no impression upon them, since, in the report they issued, no reference is made to it. 4th. That in connection with this fact, while seeing on all parts of the continent burial grounds far more ancient than our own which had yet preserved their natural level, while ours had become raised many feet by the accumulation of the bodies within them—the connection in question, pregnant as it was with matter for reflection and suggestion, is not even referred to in the report they made, and therefore that no conclusions are sought to be founded on it. 5th. That although they both saw and reported that no Government but our own entrusted so important a matter as the burial of the dead to private persons—still less to undertakers, joint-stock companies, and owners of ground interested in finding room in it for as many corpses as possible, and in enclosing those corpses in the costliest possible envelopes—they yet in their report formed no conclusions and made no recommendations on the subject; and that in suggesting the closure of the old and the opening of similar burial grounds outside the town, they leave the administration of those new burial grounds an open question. 6th. And finally, that the Government of that day in opening the new cemeteries in the stiffest clay, and in stipulating that they should not come within a specified distance of the town, forgot apparently that there was nothing to prevent the town from coming up to the new cemeteries, and, as a consequence, that one of the worst of these cemeteries, containing as it already does, unresolved 155,000 corpses in an unadvancing state of putrefaction, is now the centre of a populous and fashionable district, and that every day of the week makes a sensible addition to the horrible quotient.

It was under these circumstances that we began to hear of cremation. Now I need, I hope, scarcely say that I attach the fullest credit to any public-spirited suggestion intended to deal with so great an evil. What, however, I must say here of that suggestion is, that it was not a right suggestion, and that it was put altogether out of court by the incident which I am about to describe, and in consequence of which, as the advocates of cremation very well know, we heard no more of it for years; and then only, again, because it became evident the Government meant to do nothing.

The event in question—which put an entirely new face upon the matter, and which, though still ignored and unacted upon, is destined one of these days to relieve us of a heavy burthen, and our national

* Chadwick, Edwin, C.B., on Interment in Towns. W. Clowes, 1843.

intelligence of an equally heavy reproach—was this: In 1875 it had become necessary to level Holborn Hill, and to effect this to make a clean cut through the whole thickness of the adjacent burial ground of St. Andrew's, which at that point had become raised by the accumulation of bodies within it as much as 18 feet above its original level. That ghastly section it was my lot to see and examine. I have elsewhere described it.* It is therefore unnecessary to say more of it here than that, having been made from above downwards, and from east to west, it had exposed in their full length both the bodies of the dead and the coffins which contained them, and, that, in the exact positions they had occupied for two centuries and a half. It was also noticeable that very little, if any, soil had been allowed to remain between any two coffins, so that, as these coffins were in close apposition, each body within them had become invested with a double casing of wood. What, however, was most noticeable was the fact that both the bodies themselves and the coffins that enclosed them were, as to decay, in much the same state as when they were first buried—in a state, that is to say, of an unadvanced and unadvancing decomposition, and, even as to this, that little or no difference was observable between the interments of yesterday and the interments of Charles II.'s time. On what, therefore, I found myself in the position of having to ask myself, did a fact in every way so remarkable depend? It was not in the nature of animal matter to remain thus unresolved. All nitrogenous matters were and must be so resolved when buried within the earth. What had we here then to account for a state of things in every way so abnormal? And then it was, and not till then, that I remembered that wood was a non-nitrogenous body, and, this being so, that it would not undergo disintegration when thus buried;† and, this reflection being supported by finding the very sawdust which had been used for filling in the coffins also unchanged, it was, I found, impossible to resist the conclusion that it was the hermetical enclosure of these perishable bodies in coffins that were themselves imperishable, which had arrested their decay and prevented their resolution; in other words, that it was we ourselves, by the unintelligent practice in which we were engaged, that had brought about this terrible accumulation; and, such being the case, that it rested with ourselves—and that at any moment we pleased—to undo the mischief we had done.

But if, as I think I have now shown, it is the imperishable coffin which is the *material* cause of so much mischief, the *moral* cause of it—I regret to have to be so outspoken—is the unreasoning sentiment which prompts us to keep our dead unburied till its use becomes a necessity.‡ Why, I again ask—the terrible cost considered—do we persist in such a habit? Why does the law, so stringent on this point

* Haden, Francis Seymour, F.R.C.S. Three letters to the *Times*, January 12, March 13, and June 16, 1875. Reprinted by Macmillan.

† The deal planks on which our earliest forefathers were buried are still found in a sound state in Nottinghamshire.—*Antiquities of Myddle.*

‡ Haden, Frances Seymour, F.R.C.S. "A paper read at the Church Congress at Manchester, October 3, 1888."

in other countries, permit us to do it? The signs of death are now too well known to be mistaken by anybody. One of these signs—the *rigor mortis*—is within the recognition of anyone, and it is within the easy comprehension of everyone that it is the subsidence of this state of rigidity which is the commencement of putrefaction; and, again, that it is this commencement of putrefaction which necessitates the hermetical enclosure referred to. Obviously, therefore, what is here wanted is legal prescription—that gently imperative guidance which we all look for and find to be such a relief under circumstances which impair for a time our own proper judgment, and which at the hands of a paternal Government I say we have a right to look for. It is quite a mistake to suppose that such action would be resented. There was a *consensus* of opinion in its favour when I first wrote upon the subject,* and there would be again, the moment it was seen and understood that the Government was in earnest in the matter. Meanwhile, I hope I may be forgiven—and if I am not it matters little since I shall so soon be called upon to illustrate my own theory—if I venture to say that I know nothing more characteristic of the kind of government we enjoy than that the announcement of a state of things at once so little creditable to our intelligence, so injurious to our interests, so obvious as to its cause, and so easy as to its remedy, should, for 15 years, have been so entirely ignored as to have produced nothing better than the "memoranda" which are still issued by the Local Government Board† for what I fear I can only call improper and insanitary burial, and the unnatural, unnecessary and dangerous proposals of the advocates of cremation.

Meanwhile, the only genuine effort which has been made to deal with that form of demoralization which more or less prevails in every house on the occasion of a death, has been that inaugurated by my able and energetic friend, the Rev. Mr. Lawrence, of Weston Vicarage, York In the Church of England Funeral Reform Association, of which he is the founder, we have a strikingly sustained instance of such an effort, and it is with the greatest regret that I now see so excellent a movement in some danger of disruption. Such danger however exists, and, if I may be permitted to say so, has arisen out of a well meaning but mistaken attempt on the part of its supporters to make it a *sanitary* as well as a mere movement *ad bonos mores*. For such an extension of their original scheme they must pardon me if I say that they were not prepared, and that by education and habits of thought they are unfitted. The attempt, in fact, has opened the door for the introduction among them of theories, the mischievous character of which they were not at first able to perceive, and with which, now that they have perceived it, they are unable to cope —I mean the inroad on their councils of the cremationist and the use he has made of them for the extension of his propaganda. I very much fear that, unless by a frank return to their original programme (which was merely one for the simplification of funerals and the discouragement

---

* *Times* Leading Articles, January 12, February 2, and June 17, 1875.

† "Memorandum on the Sanitary Requirements of Cemeteries. Local Government Board, 1888.

of excess in the direction of paraphernalia), they can purge themselves of this lethal element, and so restore this otherwise excellent movement within clerical limits, it may suffer shipwreck.

I now approach the last, and perhaps the most discouraging part of the subject with which I have undertaken to deal—cremation. I have already shown that in the case of proper burial it is uncalled for, and in the case of improper burial but the substitution of one evil for another. I now say, in addition to this, that *it is a direct and potent incentive to crime.* Every one knows how often murder—especially murder by poison—has been brought to light by the exhumation, even after long periods, of the buried body, and everyone must also know how impossible such detection is when that body has been driven by the furnace into space. I am not permitted, it appears, by the rules which govern the production of these papers, to repeat here what I have said upon this part of the subject elsewhere; yet it is only by iteration and reiteration that any impression, either for good or for evil—and it matters very little, I am sorry to say, which it is—can ever be made on what is called popular opinion, which, in fact, is not "opinion" at all. Those who remember how horrified we all were at the first mention of Home Rule, and who see how easily that treasonable alternative sits on our consciences now, will bear me out in this, and will understand how it is that, being denied the use of this effective weapon, I have no choice but to appeal and re-appeal to the Government to expose and dispose, at once and for ever, of the whole so-called "argument" in favour of cremation. They can do it if they please as readily as they disposed of the dangerous, but far less dangerous, use of explosives. A simple return of the number of exhumations rendered necessary for the detection of murder within the last 25 or 30 years will prove, I undertake to say, abundantly sufficient for the purpose. I respectfully call upon them for information on the subject.

Meanwhile, what *is* the argument in favour of cremation? It is based, so far as I can see, chiefly on statements which depend for their intended effect on a simple misuse of language and on the effect of that language, not on the popular intelligence, but on the popular ear. In the *Nineteenth Century*, of last May,* we have an example of such language in its quintessence. The buried body, the cremationist had already told us, does not, as I say it does, re-enter the atmosphere to contribute to its renewal and to the nourishment and growth of plants, but depends for its resolution "at least in an equal degree" (I use the very words of "an expert" called in by the cremationist element on the Council of the Church of England Funeral Reform Association to warrant their rejection of my views on the subject) it depends at least in an equal degree on the action of microbes, which action the public understands as a ghoul-like form of cannibalism on the part of these novel agencies; and they are largely assisted in this belief by finding in such a popular article as that to which I am directing your attention, these lowest forms of vegetation described as "creatures," "leaping" and "darting" on their "prey," &c., precisely as if they were endowed,

* "The Realm of the Microbe."

in what are also called "their habits," with something like volition. Well, I entirely acquit the charming and gifted writer of this article of anything more than a desire to popularise the study of bacteriology; but I do not acquit the apostles of cremation of a readiness to profit by such writing, and, by not repudiating it, of leaving on the mind of the uninitiated the impression that the human body committed to the earth is really subjected to such assaults, and of so creating a prejudice against its proper burial and in favour of cremation. As well might it be said that the visible propulsion forward of a crystal in a saturated solution, or of the frost upon the window-pane, is evidence of animal life and of a predatory instinct. Nor, though I make no pretension to be an expert myself, can I bring myself to believe that these unpretending saprophytic little fungi, so useful on the surface, are likely to be found at all as much as four feet below the surface, which it will be remembered is the minimum depth prescribed by the Local Government Board for the interment of adults.

In conclusion, I can only repeat my conviction that what is wanted is not a Bill to regulate cremation—which, on the contrary, *as a measure of public safety*, ought rather to be once declared illegal—but a Bill to regulate and ensure *safe and proper burial*; which Bill to be effectual should also, I think, besides dealing with the whole subject of cemeterial management contain the following provisions:—

(1.) For burial within the earth as the only legal mode of disposing of a dead body.

(2.) For a limitation of time beyond which it should be illegal to keep a dead body unburied.

(3.) For the illegality of strong coffins, brick graves and vaults, and of all contrivances having for their effect to retard resolution, and to confer on the dead a tenure, practically illimitable, of the soil which is necessary to the purposes of the living.

And I would even go further, and venture to affirm that such a Bill, besides being a measure of great social, economical and sanitary importance, would be a positive and grateful relief to everybody.

La Crémation en France, 1889-91.

PAR

Georges Salomon, Ingénieur, Sécrétaire Général de la Société Française de Crémation.

J'ai exposé au dernier Congrès International d'Hygiène qui s'est tenu à Paris en Août 1889 les grands faits relatifs à la crémation en France entre le moment où la révolution française prenait l'initiative du rétablissement de cette antique coutume, et le jour où je prenais la parole (1797-1887). Cet exposé est contenu tout au long dans les

précieuses annales formées par les comptes-rendus des travaux des Congrès internationaux d'hygiène, dans le tome précédant immédiatement celui qui s'élabore à Londres en ce moment ; il me suffit donc de mettre, à ce jour, la question au point. À relater ainsi les faits accomplis dans notre pays, nous fournirons peut-être quelque enseignement utile à ceux qui militent de toute part, en faveur de la crémation.

1. Règlementations.

Les dispositions libérales du règlement d'aministration publique du 27 Avril 1889 que règlemente l'exercice de la crémation aux termes de la loi sur le liberté des funérailles du 15 Novembre 1887 n'ont entrainé aucun des dangers ni des inconvénients que les adversaires de la crémation avaient prédits.

Aucune réclamation, aucune doute n'a été soulevé sur les causes de la mort à la suite des incinérations effectuées à Paris jusqu'à ce jour. Il suffit, on le sait, en vertu de ce règlement de faire une demande au Maire de la localité du défunt et d'y joindre un certificat du médecin traitant, attestant que la mort est due à une cause naturelle. À défaut de ce certificat—il n'y a pas toujours médecin traitant—le médecin assermenté délégué par le Maire est chargé de procéder à une enquête sommaire dont il consigne les résultats dans le rapport qu'il a toujours pour mission de présenter.

Une circulaire ministérielle du 25 Mai 1890 a déterminé les conditions relatives au transport des corps destinés à être incénérés à Paris. Cette circulaire rédigée sur avis du *Comité consultatif d'hygiène publique de France* est aussi conçue :—

"Dans l'état de nos mœurs, il a paru que le respect dû aux morts ne permettait pas de retirer le cadavre de la bière pour le livrer nu aux flammes et qu'il convenait de brûler, avec le corps, l'enveloppe qui le contient.

"Il importe, en conséquence, dans la confection des cercueils qui seront introduits dans le four crématoire, ainsi que dans le choix des désinfectants, d'écarter certaines matières, dont la combustion présenterait des dangers ou des difficultés spéciales.

"Les expériences qui ont été faites ont démontré qu'il convenait de ne point livrer aux flammes diverses substances dont l'emploi a été prescrit pour le transport des corps par M. le Préfet de police dans son instruction du 1er mai 1860 relative aux opérations concernant les décès. Ces substances sont : le bois de chêne, le plomb et un mélange pulvérulent composé de tan et de charbon. En effet, les cercueils en chêne fort ne brûlent que difficilement en laissent comme résidus des braises qui se mélangent avec les cendres.

D'autre part, le plomb des cercueils soumis à la température élevée du four crématoire forme avec la silice des briques un composé chimique qui amène la destruction rapide du four. Enfin, la poudre de tan et de charbon pulvérisé peut former à la chaleur un mélange détonant et amener une explosion.

Il y a lieu de prescrire deux séries de mesures devant être prises les unes au domicile mortuaire, les autres au monument crématoire.

1°. *Au Domicile Mortuaire.*—" Le corps sera placé dans un cercueil en bois léger, de préférence en bois de peuplier et, à défaut de bois de peuplier, en bois de sapin, de bouleau ou d'aulne.

" Les dimensions de ce cercueil ne pourront excéder les mesures suivantes : longueur 2 mètres, largeur 0^m, 60, hauteur 0^m, 50. Les parois intérieures de ce cercueil seront badigeonnées au goudron : cet enduit devra être appliqué de façon que les joints soient rendus bien étanches. Le cercueil sera garni intérieurement de toile caoutchoutée ou de carton bitumé en un seul morceau et plié de toile façon qu'il en résulte une sorte de cuvette bien étanche capable de retenir les liquides qui s'échapperaient du corps. Le vide entre le corps et la telle caoutchoutée ou le carton bitumé sera comblé par une des substances absorbantes suivantes : poudre de tourbe, déchet de coton, sciure de bois. Ces substances seront introduites par couches et chaque couche sera légèrement imbibée d'une solution phéniquée forte : la totalité du liquide employé ne devra pas dépasser 400 grammes.

" Si le transport du corps doit avoir lieu à une distance moindre de 200 kilomètres, ce premier cercueil sera renfermé dans une bière en chêne ou en bois présentant une solidité égale : les parois auront 25 millimètres d'épaisseur ; elles seront assemblées à vis, de façon à pouvoir être démontées rapidement ; elles seront consolidées au moyen de deux frettes en fer vissées.

" Si la distance à parcourir est de 200 kilomètres et au-dessus, le premier cercueil en bois léger sera enveloppé dans un cercueil confectionné avec des lames de plomp de 2 millimètres et demi d'épaisseur et parfaitement soudées entre elles. Le cercueil en bois et celui en métal seront entièrement indépendants l'un de l'autre.

" Le cercueil en plomb sera renfermé lui-même dans le cercueil extérieur en chêne ou en bois dur dont il vient d'être fait mention.

2°. *Au Monument Crématoire.*—" Le corps devra être incinéré dans les vingt-quatre heures qui suivront son arrivée dans le monument crématoire.

" Si le corps est enfermé dans une triple enveloppe, on dévissera le cercueil extérieur en bois et on placera le cercueil en métal sur une table formée d'une substance imperméable aux liquides.

" Avant d'ouvrir le cercueil en plomb, on y pratiquera un orifice très petit pour donner issue aux gaz, lesquels seront désodorisés à leur sortie.

" On ouvrira le cercueil en plomb de façon à pouvoir en extraire facilement le cercueil intérieur en bois qui sera aussitôt introduit dans le four crématoire.

" Si des liquides s'étaient écoulés hors du cercueil intérieur en bois, on les essuierait soigneusement avec des chiffons imbibés d'une solution phéniquée à 5 p. 100 qu'on brûlerait aussitôt dans un foyer.

Aussitôt après l'extraction du cercueil intérieur en bois, le cercueil en plomb sera désinfecté à fond par le procédé du flambage.

"Seul le cercueil intérieur en bois léger devra être introduit dans le four crématoire. Il en sera ainsi alors même que ce cercueil ne serait point enveloppé de plomb et serait enfermé uniquement dans une bière de chêne ou de bois dur."

La Préfecture de la Seine a résumé ces renseignements dans une notice qui doit être remise dans les mairies de la capitale lors des déclarations de décès. Jusqu'à présent cette notice destinée essentillement à appeler l'attention du public sur le nouveau mode de sépulture n'a pas été distribuée avec régularité. Elle expose que les familles sont chargées de fournir l'urne cinéraire. Si l'urne doit être placée dans une sépulture particulière les familles sont libres d'adopter la forme et la matière qu'elles jugent convenables. Si cette urne doit être placée dans un columbarium de la Ville de Paris elle doit avoir les dimensions suivantes :—

Hauteur, 0m 28.
Longueur, 0m 48.
Largeur, 0m 28.

Le tarif des incinérations établi par délibération du Conseil Municipal du 7 Août 1889 a déjà été remanié. Nous demandions dans notre rapport au Congrès de Paris que la taxe fut réduite ; satisfaction nous a été donnée. Une délibération du Conseil municipal du 27 Décembre 1889 a établi le tarif suivant :

1re classe - - - - -	250 f.
2e „ - - - - -	
3e „ - - - - -	200
4e „ - - - - -	150
5e „ et corps amenés directement de l'extérieur - - -	100
6e „ - - - - -	50
7e „ - - - - - -	
8e „ - - - - -	
Service ordinaire - - - -	
„ gratuit - - - - -	Néant.

La tenture du monument crématoire est fournie aux familles par l'Administration des Pompes funèbres, conformément au tarif fixé par décision préfectorale du 20 Avril 1889.

Toute incinération dans les appareils crématoires de la Ville de Paris donne droit à l'occupation pendant cinq ans, si cela est demandé, d'une case dans le columbarium.

A l'expiration de ce délai, l'occupation de la case pendant une nouvelle période au quinquennale sera autorisée moyennant cinquante francs. Si ce renouvellement n'est pas demandé par la famille, les cendres seront déposées dans une tranchée spéciale du cimetière.

C'est là, évidemment, une durée insuffisante. Les partisans de la crémation ont toujours estimé avec raison que, du fait du peu de volume d'une urne, on pourrait la conserver dans le columbarium pendant la durée d'une ou deux générations. De cette façon, l'incinération permettrait au pauvre de pratiquer le culte du souvenir, elle rétablirait

l'égalité dans le mort, elle remédierait aux hontes, aux profanations de la fosse commune.

Le dépôt dans le columbarium n'est pas obligatoire ; les cendres peuvent être inhumées et bien entendu, l'administration ne requiert pas dans ce cas les mesures établies pour l'inhumation des cadavres. Le nombre des urnes que l'on peut placer dans une concession n'est limité que par la place dont on dispose, point n'est besoin d'isoler l'urne de l'air extérieur par une couche de terre d'une épaisseur déterminée. Point n'est besoin non plus de la même superficie de terrain ; un arrêt du préfet de la Seine, en date du 27 Juillet 1890 a établi " qu'il sera " accordé aux personnes qui en feront la demande, des concessions de " 1 mètre au minimum, pour y déposer les urnes contenant les cendres."

On le voit, la crémation aujourd'hui facultative en France n'est entravée par aucune formalité génante. N'oublions pas que dans certains états les adeptes de la crémation ont été moins favorisés. Ainsi que dans les précédents Congrès internationaux d'hygiène demandons en un vœu solemnel que *les gouvernements fassent disparaître les obstacles qui s'opposent encore à la crémation des cadavres.*

Nous avons chaque jour plus d'autorité pour émettre un tel vœu ; chaque jour l'expérience démontre d'avantage l'inanité des objections relatives à la securité publique. Et puisque nous nous adressons aux gouvernements demandons leur à nouveau *d'aviser à organiser la crémation des cadavres sur les champs de bataille*, l'utilité de cette demande n'a plus à être demontrée.

(2.) Monuments.—Appareils.

Le monument ou plutot l'embryon de monument crématoire du Père Lachaise est à peu près dans l'état on l'ont vu les membres du Congrès international d'hygiène de 1889. Au dehors et au dedans ce sont les mêmes murailles nues et inachevées. Ses murailles pourront être décorées, mais on ne pourra pas élargir suffisamment ses salles d'incinération par trop étraites. Le columbarium provisoire établi dans le sous-sol est déjà entièrement occupé. Aussi a-t'-on amorcé le long du mur d'enceinte du cimetière proche du monument, le columbarium définitif. C'est un portique de pierre et de fer complétement dénué d'ornementation, capable de contenir 300 cases ; il a 4 mètres de largeur sur 12 mètres de longueur ; son prix de revient est d'environ 18,000 fr. Ainsi adossé au mur d'enceinte, il pourra selon les besoins être prolongé le long du mur. L'administration s'est particulièrement attachée à perfectionner les appareils crématoires. Elle s'est decidée ainsi que nous le demandions à démolir le four à reverbère au bois dit du système Gorini, et Paris possède aujourd'hui deux appareils fondés sur les principe du système Siemens.

L'appareil à air chaud construit par MM. Toisoul et Fradet, et par nous décrit en 1889, a coûté 20,000 fr. alors que le reverbère au bois en a coûté 8,000 fr. ; mais lorsque, comme à Paris, le fonctionnement est continu, la différence des frais de premier établissement est très largement compensée par l'économie du combustible. Les frais de mise en

feu relativement coûteux avec un appareil à gazogène et recupérateur deviennent insignifiants lorsqu'ils sont répartis sur le total des incinérations effectuées en 24 heures. L'appareil Toisoul et Fradet consomme, paraît-il de 11 à 12 hectolitres de coke par 24 heures. La durée des opérations y varie selon les cadavres de une heure à une heure et demie au maximum.

A ses côtés, sur l'emplacement occupé par le four à reverbère s'élève le second appareil du même système dû à M. Fichet, ingénieur civil. Nous ne saurions mieux faire que de réproduire ici la description qui en a été faite par son auteur :—

" L'appareil se compose de trois parties principales :

Une chambre voûtée dans laquelle s'effectue la crémation ;

Un récupérateur destiné à utiliser la chaleur des gaz sortants à la production de l'air chaud ;

Un gazogène qui fournit l'oxyde de carbone nécessaire au chauffage.

Le chambre voûtée a 0^m 90 de largeur, 2^m50 de long 0^m70 de hauteur sous clé. Elle est fermée en avant par une porte en dalles réfractaires montées dans un cadre en fer. La porte s'appui par son poids sur un encadrement de la devanture en forme de plan incliné de façon à assurer une bonne fermeture. Eile est suspendue au moyen de chaînes passant sur des poulies et équilibré par des contrepoids pour que les mouvements de montée et de descente aient lieu sans effort.

Un écran en tôle est fixé à la porte et se meut avec elle ; il est maintenu à quelques centimètres de distance et un courant d'air circule entre la porte et l'écran. On évite ainsi le rayonnement de la chaleur en avant du four.

Des canaux ont été ménagés dans l'épaisseur des murs pour l'arrivée de l'air chaud venant de récupérateur, et de l'oxyde de carbone et pour le départ des gaz brûlés.

Au fond, à l'opposé de la porte, le mur est percé de trois regards qui permettent de suivre la marche de l'opération.

La sole de la chambre est en pièces réfractaires et creusées de deux profondes rainures pui vont de la façade au fond. Elles sont destinées à loger les bras en fer du chariot d'introduction et de sortie.

A 10 centimètres de hauteur au-dessus de la sole, les murs, latéraux sont garnis d'une série d'orifices qui règnent sur toute la longueur. D'un côté, ces orifices servent à l'arrivée de l'air et de l'oxyde de carbone, du côté opposé, ils servent au départ des gaz.

Ceux-ci se rendent tout d'abord dans une deuxième chambre voûtée semblable à la précédente et placée directement sous la sole. C'est dans cette deuxième chambre qu'aboutit le récupérateur qui est formé d'une série de poteries rectangulaires placées verticalement, et entretoisées de façon à être maintenues à quelque distance l'une de l'autre. Les gaz descendent à l'intérieur des poteries, et l'air s'échauffe

en montant tout autour dans les espaces ménagés au moyen des entretoises.

Le récupérateur est construit tout entier en matériaux réfractaires, d'une pâte dure et compacte, très dense et très cuite. Avant de fermer le four, on a déposé dans la chambre inférieure un peu de sel marin qui, en se volatisant lors de la mise en marche, est venu former à la surface des pièces tubulaires un glacis qui assure leur imperméabilité. Des dispositions spéciales de joints à glissements ont été prises pour assurer la liberté des mouvements de dilatation, sans permettre le mélange de l'air chaud circulant autour des tubes avec les gaz brûlés qui passent dans leur intérieur.

Des orifices d'admission pour l'air et pour l'oxyde de carbone ont été ménagés dans la chambre inférieure comme dans celle du haut.

Toutes les admissions d'air et de gaz sont réglables à volonté au moyen de registres à crémaillères qui se manœuvrent tous à l'arrière du four, de telle sorte qu'il n'y a aucun service apparent ni sur la façade ni sur les côtés.

On avait observé, dans le four construit précédemment, qu'au moment de l'introduction du cercueil, il se produisait subitement un fort dégagement de gaz enflammés et que la flamme sortait par la porte avant qu'on ait le temps de la refermer ; il nous avait été particulièrement recommandé d'éviter ce rejet de flammes qui avait détruit des tentures et qui produisait sur l'assistance une impression fâcheuse.

Dans ce but, nous avons pratiqué une ouverture dans la voûte près de la façade. Les flammes qui lèchent la voûte passent par cette coupure, et se rendent dans la chambre intérieure par deux cheminées verticales munies de registres, qui ont été réservées dans l'épaisseur du mur d'arrière.

Notre attention avait été aussi appelée sur l'importance qu'il y avait à éviter l'abondant dégagement de fumée qui se produisait pendant une dizaine de minutes au début de l'opération. Nous indiquerons plus loin comment nous sommes arrivés à la supprimer.

Le gazogène fonctionne à la façon des appareils analogues, nous l'avons disposé avec grille horizontale pour permettre en cas de besoin la marche intermittente.

Le tirage de la cheminée se règle au moyen d'un registre pivotant autour d'un axe équilibré au moyen d'un contrepoids. Des renvois de mouvement par chaînes et poulies aboutissent à un levier mobile sur un secteur, placé à l'arrière du four, à côté des autres registres de gaz et d'air, de telle sorte que le surveillant qui observe la marche de l'opération, au moyen des regards du fond, a sous la main tous les moyens de réglage.

Conduite de l'appareil.—Pour amener l'appareil à la température convenable, rouge cerise, environ 700° à 800°, on envoie le gaz dans la chambre supérieure où l'on a eu la précaution de faire un petit feu de bois sec. Le gaz s'allume en traversant la flamme du bois, et la flamme descend dans la seconde chambre jusqu'au récupérateur qui ne tarde pas à s'échauffer. Au bout de quelques heures l'appareil étant entièrement chaud du haut en bas, on peut procéder aux crémations.

rencontre le gaz oxyde de carbone qui s'enflamme aussitôt ; la chaleur ainsi produite maintient la température du récupérateur.

Tout serait pour le mieux, si la combustion de la matière organique dans la chambre supérieure était assez active pour y maintenir une haute température. Malheureusement, il n'en est pas ainsi, et petit à petit cette chambre se refroidit. Il faut donc, au bout de quelque temps y envoyer un peu de gaz. C'est regrettable, car bien que cette quantité de gaz soit minime. Elle produit toujours un appauvrissement en oxygène, d'où il résulte une prolongation dans la durée de l'opération.

Il aurait été préférable assurément de remplacer la chambre par une moufle chauffée à l'extérieur. Cela n'a pas été possible à cause de l'exiguité de la pièce destinée à recevoir le four. Elle n'a que 4^{m} 50 de largeur et il était nécessaire de réserver des passages convenables de chaque côté de l'appareil.

Comme résultat obtenu, on peut dire que l'appareil est complètement fumivore, et que la durée d'une crémation varie en moyenne entre 45 minutes et une heure.

La quantité de combustible brûlée en 24 heures est d'environ 18 hectolitres de coke, soit 720 kilogr.

Pour ce rendre compte de l'effet utile du combustible, il convient d'en faire deux parts, l'une destinée à combattre le refroidissement par les parois et que l'on peut évaluer à 7 ou 8 hectolitres par 24 heures, l'autre portion, soit 10 hectolitres, est employée à effectuer les crémations pendant 10 heures, depuis 8 ou 9 heures du matin jusqu'à 6 heures du soir, ce qui représente environ 1 hectolitre, soit 35 à 40 kilogr. par opération.

Quand on brûle les cadavres des amphithéâtres de dissection, on en met, comme nous l'avons dit, trois à la fois dans le four. L'opération, dans ce cas, dure une heure et demie, de telle sorte qu'en une journée, sans service de nuit, on peut incinérer 18 corps et faire, en outre, une crémation particulière."

Pour être absolument impartial nous devons dire ici, d'après les renseignements qui nous ont été fournis par les agents de l'administration chargés de sa conduite que l'appareil Fichet n'opère pas plus rapidement que l'appareil Toisoul et Fradet, qu'il na pas supprimé le panache de fumée noire qui s'élève au dessus de la cheminée, et qu'il consommerait 19 à 20 hectolitres de coke par 24 heures là, où l'autre n'en consommerait que 11 à 12. Par contre, il est bien positif qu'il se manœuvre plus facilement et qu'il empêche, fors de l'introduction du cercueil, le rejet de flammes qui émouvait, à la façon de flammes infernales, les personnes sensibles.

(3.) Propagande.—Obstacles.—Réformes.

Au moment où la crémation fut autorisée et réglementée en France, certaines personnes estimèrent que la société de crémation n'avait plus qu'à crier victoire et à laisser aux municipalités le soin d'ériger des monuments crématoires. D'autres, au contraire, pensaient avec raison

qu'il ne suffisait pas d'introduire une réforme dans la loi pour qu'elle fut appliquée, et qu'avant de disparaître, la société de crémation devait s'occuper de modifier les mœurs, de réagir contre les habitudes, les préjugés, les partis pris en faveur de l'inhumation. Cette dernière opinion a prévalu. En effet, c'est à des groupes, à des sociétes privés et non aux gouvernements ni aux municipalités qu'il appartient de préconiser une réforme qui suscite des objections religieuses.

La société de crémation ne se borne pas à signaler au public par des conférences ou des écrits les avantages de la crémation. Empêchée de pratiquer la crémation, elle veille à ce que les municipalités, seules chargées de cette tâche, la remplissent au mieux ; elle étudie les perfectionements à apporter aux monuments ou appareils, et les modifications à introduire dans la réglementation en usage. De plus, pour favoriser le mouvement crémationiste elle a fondé une sorte de mutualité. Lorsque le coût total de l'incinération d'un de ses membres (frais de transport, d'opération et autres), est trop élevé pour que la famille y puisse subvenir, la société se substitue à celle-ci avec la discrétion la plus absolue, pour tout ou partie de la dépense. Enfin, si délicate que soit cette tâche, elle se charge d'assurer l'exécution de la dernière volonté de ses membres ; elle rappelle aux familles qui, d'aventure, y contreviennent que la loi sur la liberté des funérailles autorise à en appeller en justice de leur opposition, et établit des pénalités contre toute personne qui dûment prévenue aura donné aux funérailles et aussi au *mode de sépulture*, un caractère contraire à la volonté du défunt.

L'action de la société s'étend sur toute la France, mais, actuellement, la ville de Paris, seule, possède un monument crématoire. La question est sérieusement à l'étude à Lyon et dans quelques villes, mais, il faut le reconnaître elle ne progresse que lentement. A Paris du 1er janvier au 31 décembre 1889, on avait effectué 48 incinérations demandées par les familles ; il est vrai que jusque vers le milieu du mois d'août de la dite année, le monument crématoire n'avait été ouvert qu'à titre d'exception, sur autorisation spéciale. Du 1er janvier au 31 décembre 1890, ce chiffre s'est élevé à 121, savoir : 65 hommes, 36 femmes, et 20 enfants. Quatorze corps provenaient de la province, les 107 autres appartenaient au département de la Seine. Les résultats des premiers mois de cette année ne permettent pas de prévoir une modification appréciable des chiffres précédents. En 1890, le nombre des incinérations des corps provenant des amphithéâtres d'anatomie a atteint 2,188, et celui des embryons 1,079.

Les hygiénistes français peuvent se féliciter de ce dernier résultat ; peu importe que les cadavres proviennent ou non des hôpitaux, c'est autant d'arraché à la putréfaction, à la pestilence, mais ce n'est pas assez. Ils ont été entendus par les corps savants, là où règne la science règne aussi la raison, ils doivent désormais, dans l'intérêt de la santé publique, objet de tous leurs soucis, se faire entendre par le grand public. Chaque jour un fait nouveau vient les y inciter. Dans le courant de l'été 1890, pour trouver aux morts de Paris, la place qui manque, on a effectué des fouilles au cimetière Montparnasse, dans le lieu où furent inhumés

les cholériques de 1832. Après cinquante-huit années, les corps amoncelés avaient pour le plupart conservé leur forme. On piochait dans un monceau de chair humaine en décomposition. Il fallut au plutôt refermer cet immonde charnier pour éviter l'empoisonement général. Vers la même époque, en effet, le choléra avait fait son apparition, non loin de Valence, en Espagne, à la suite de fouilles dans un cimetière où des cholériques avaient été inhumés en 1885. Jusqu'à ce jour, les hygiénistes ont apporté un puissant appui aux sociétés de crémation, elles ont millité auprès du législateur, des gouvernements, des municipalités, les vœux des congrès internationaux premier d'hygiène, à la main. Pour que les fruits de cette campagne ne soient pas perdus, il conviendrait que les hygiénistes se fissent spontanément auprès du public, en toute occasion, avec ou sans le concours des sociétés de crémation, les apôtres de cette salutaire pratique. Si singulier que cela puisse paraître, nous serions heureux de voir le congrès convier les hygiénistes du monde entier à un apostalat, au cours duquel laissant un instant de côté les raisons scientifiques qui n'émeuvent guère la foule, ils opposeraient le sentiment au sentiment, la vérité à l'erreur, et même l'erreur à l'erreur! Les poètes ont chanté l'éternel sommeil au sein de la terre bienfaisante, et ont tressé d'élégantes idyles en l'honneur des champs de repos. Signalons, à l'inverse, les horreurs de la décomposition lente et putride au sein de la terre humide; exhumons l'être chéri, montrons la grande tranchée d'où les cadavres à peine décomposés sont arrachés pêle-mêle pour être enfouis en quelque coin perdu. Crions à l'iniquité, à la profanation et exaltons la beauté, les vertus purificatrices du feu! Sous la nappe de flammes qui le réchauffe, l'affine, le corps aimé, admiré est transformé, pour ainsi dire, instantanément en une légère fumée et quelques poignées de cendres blanches que les générations vénéreront à jamais! Puissions-nous trouver les accents propres à émouvoir les âmes, et notre cause sera gagnée, à condition toutefois que les faits ne nous démentent pas trop crûment. Il n'y a pas seulement des libre-penseurs parmi les adeptes de la crémation, des libre-penseurs à qui importe peu que leur corps disparaisse en une heure ou en deux, qu'il soit rongé par les vers ou mordu par le feu, qui demandent la crémation parceque c'est un mode de sépulture éminemment rationnel, il y a parmi les partisans de la crémation d'ardents spiritualistes, des natures fines, pleines de sentiment que sollicite l'amour du pur et du beau. Pour ceux-là, pour tous ceux, ils sont légion qui ont la terreur de l'au delà, pour qui la tombe est le mystère, pour tous ceux-là, une propagande de plus de dix années auprès du public nous autorise à le déclarer, il faut pratiquer la crémation avec solennité, à la façon d'un culte. Les promoteurs de la crémation sont la révolution, l'avient ainsi compris. Dans un rapport sur les sépultures présenté en l'an VII. (1798) à l'administration centrale du Département de la Seine le citoyen Camby proposait d'élever sur les hauteurs de Montmartre un fastueux monument: "Quatre grandes "portes dédiées à l'enfance, à la jeunesse, à la virilité, à la vieillesse ser- "viraient d'entrée à ce grand établissement, elles conduiraient, par quatre "routes sinueuses au monument central, image du dernier terme de la "vie. Ce monument offre une pyramide de vingt-huit mètres de base

" un trépied la couronne. Cetta pyramide sérait disposée dans l'intérieur " de manière à ce que le travail nécessaire pour consumer les corps pût " se faire *sans que le public s'en apeçût.*" Le rapport règle ensuite avec cette pompe toute païenne si fort prisée au temps de la révolution la façon dont les corps devaient être amenés " dans l'intérieur de ce majestueux monument." Cet excès de solemnité, assurément critiquable, serait préférable au sans-façon scientifique avec lequel on opère au Père-Lachaise. Les agents de l'administration, reconnaissons le font preuve de tact et de décence, les appareils fonctionnent d'une manière satisfaisante mais le cadre et les instruments ne sont nullement en harmonie avec la grandeur, le caractère de l'ultime opération qui s'y accomplit. Encore privé d'une façade, avec son entrée provisoire, ses cheminées mal dissimulées et maculées de suie, le monument crématoire, sorte d'usine Macabre détonne lugubrement au milieu des ombrages et des tombes artistiques du cimetière. À l'intérieur, les murailles à peine recouvertes de draperies, le chariot d'introduction avec ses grands bras et son mécanisme apparent, la carcasse de briques et de fer de l'appareil, disons plutôt du four, pour parler comme l'administration, le manque d'espace, le spectacle de l'enfournement du cercueil, du *défournement* des cendres, le manque absolu de cérémonial, en un mot tout ce qui se fait, se voit et se dit, est si crû, si pitoyable qu'à moins d'avoir l'esprit fortement trempé, on préférera l'inconnu, le mystère de la tombe; ou bien, pris de désespérance, redoutant également l'incinération et l'inhumation, on se cantonnera dans l'indifference finale; ce sera le succès définitif de la routine, du parti-pris, de l'ignorance! Le monument inachevé du Père-Lachaise a beaucoup plus nui au développement de la crémation en France que l'opposition du clergé catholique. Sacrifiant aux goûts et aux habitudes des populations, les premiers Chrétiens se sont fait un culte à l'image des païens; ils ont adopté la pompe de leurs cérémonies religieuses, ils ont orné leurs pierres tombales, d'idoles qu'ils se défendaient d'adorer. À notre tour, nous sommes conduits à nous inspirer des pratiques du catholicisme pour renover et faire prospérer une coutume païenne; employons plus de festons, d'astragales, de fleurs, de draperies; des chants, de la musique, des discours, sans exagération bien entendu, ou c'en est fait de notre cause jusqu'au jour où l'encombrement des cimetières imposera de décréter l'obligation là ou nous voudrions voir toujours la liberté.

En conséquence nous demandons au Congrès d'émettre le vœu :

Que l'opération de la crémation soit effectuée avec un cérémonial imposant dans des monuments ornés et aménagés avec la plus grande perfection.

Note sur la Crémation à Paris en 1891.

PAR

M. Charles Caffort, Chef du Bureau des Cimetières de la Ville de Paris.

L'historique de la question de la crémation a été fait tant de fois qu'il semble inutile de la refaire. Rappelons seulement en quelques mots que, en ce qui concerne l'Europe, après plusieurs siècles de disparition absolue, la crémation dut sa résurrection au moins en principe à la Révolution Française de 1789, et que la première incinération des temps modernes eut lieu à Paris le 1er floréal an IX. (autorisation donnée par Frochot, Préfet de la Seine, à la citoyenne Dupré Geneste, épouse du citoyen Lachèze, de brûler le corps de son enfant âgé de huit mois). C'est également la Ville de Paris, qui, avant même que la crémation fût autorisée légalement en France, obtenait, après de vives instances auprès du gouvernement, l'autorisation de construire dans un de ses cimetières un appareil destiné à incinérer les débris humains provenant des amphithéâtres de dissection, appareil qui a pu, dès la promulgation de la loi autorisant la crémation facultative, servir à des incinérations.

Enfin, actuellement encore, la ville de Paris est la seule ville Française qui possède un appareil crématoire.

Les renseignements qui font l'objet de la présente note, bien que spéciaux à Paris, s'appliquent donc à la France entière.

Législation.

La loi du 15 septembre 1887 sur la liberté des funérailles a autorisé le choix de modes de sépulture autres que l'inhumation, tout en décidant qu'un règlement d'administration publique déterminerait les conditions afférentes aux divers modes de sépulture.

Ce règlement a été promulgué le 27 avril 1889, en voici la teneur en ce qui concerne la crémation :—

TITRE III.

De l'Incinération.

Art. 16.—Aucun appareil crématoire ne peut être mis en usage sans une autorisation du Préfet accordée après avis du Conseil d'Hygiène.

Art. 17.—Toute incinération est faite sous la surveillance de l'autorité municipale. Elle doit être préalablement autorisée par l'officier de l'état civil du lieu du décès, qui ne peut donner cette autorisation que sur le vu des pièces suivantes :

1° Une demande écrite du membre de la famille, ou de toute autre personne ayant qualité pour pourvoir aux funérailles ; cette demande indiquera le lieu où doit s'effectuer l'incinération.

2° Un certificat du médecin traitant, affirmant que la mort est le résultat d'une cause naturelle.

3° Le rapport du médecin assermenté commis par l'officier de l'état civil pour vérifier les causes du décès.

A défaut d'un certificat d'un médecin traitant, le médecin assermenté doit procéder à une enquête sommaire dont il consignera les résultats dans son rapport.

Dans aucun cas, l'autorisation ne peut être accordée que si le médecin assermenté certifie que la mort est due à une cause naturelle.

Art. 18.—Si l'incinération doit être faite dans une autre commune que celle où le décès a eu lieu, il doit en outre être justifié de l'autorisation de transporter le corps, conformément à l'art 4.

Art. 19.—La réception du corps et son incinération sont constatées par un procès-verbal qui est transmis à l'autorité municipale.

Art. 20.—Les cendres ne peuvent être déposées, même à titre provisoire, que dans des lieux de sépulture régulièrement établis.

Art. 21.—Les cendres ne peuvent être déplacées qu'en vertu d'une permission de l'autorité municipale.

Art. 22.—Toute contravention aux dispositions réglant les conditions des sépultures et contenues dans les articles 3, 4, 8, 12, 16, 17, 18, 20 et 21, est passible des peines prévues aux articles 3 et 5, de la loi du 15 Novembre 1887.

I. Formalités pour les Incinérations.

1° *Décès survenus à Paris.*

En pratique, à Paris, il est procédé de la manière suivante.

Toutes les fois qu'une personne se présente à la mairie pour déclarer un décès, il lui est remis une notice imprimée indiquant les formalités à remplir pour les incinérations.

Si la famile choisit ce mode de sépulture, elle doit prévenir immédiatement la mairie, et lui remettre, 1° la demande écrite: 2° le certificat du médecin traitant visés par l'art. 17 du décret du 27 avril 1889, ci-dessus:—

La mairie prévient directement le médecin chargé de la contre visite.

Il y a à Paris actuellement deux médecins préposés à ce service, pour lequel ils ont prêté serment devant la 1ere Chambre du Tribunal de la Seine; un honoraire de 10 francs payé par la ville, leur est attribué par chaque vacation.

L'heure du convoi est fixée par la mairie qui s'entend téléphoniquement à cet égard avec l'administration centrale (bureau des cimetières à l'hôtel de ville).

Comme pour les décès suivis d'inhumation, la famille s'entend avec l'administration des pompes funèbres pour la classe du convoi et les fournitures réelles.

Il est recommandé, pour les corps destinés à être incinérés, de ne prendre qu'une bière en peuplier ou en sapin, dans laquelle ne doit être introduite aucune étoffe, papier ou substance quelconque.

2°. *Décès survenus en dehors de Paris.*

Si le décès est survenu non à Paris mais en province, toutes les pièces mentionnées par le décret doivent être produites à la mairie du lieu du décès, seule compétente pour autoriser l'incinération ; à Paris, il suffit de présenter au bureau des cimetières :—

1°. l'autorisation du maire ;

2°. l'autorisation de transport du corps délivrée par le Préfet de Police.

Les conditions pour la mise en bière et le transport des corps destinés à être incinérés ont été déterminées par la circulaire Ministérielle du 27 Mai 1890.

En voici le résumé :—

Le corps doit être placé dans un cercueil en bois léger, dont les dimensions au maximum seront : longueur 2 mètres, largeur 0·60, hauteur 0·50, et dont les parois intérieures seront badigeonnées au goudron, et garnies de toile caoutchoutée ou de carton bitumé :—

Le vide entre le corps et la garniture intérieure sera comblé par une substance absorbante, telle que poudre de tourbe, déchets de coton, sciure de bois, imbibée d'une solution phéniquée.

Si le transport du corps doit avoir lieu à une distance moindre de 200 kilomètres ce premier cercueil sera enfermé dans une bière en chêne à parois de 25 millimètres d'épaisseur assemblées à vis et consolidées par deux frettes en fer vissées.

Si la distance à parcourir, est de 200 kilomètres ou au-dessus, le 1er cercueil sera renfermé dans une bière de plomb, recouverte d'une enveloppe de chêne. A l'arrivée au monument crématoire, ces enveloppes sont dévissées, et le cercueil en bois léger est seul introduit dans le four crématoire.

3°. *Urnes.—Columbarium.*

Après l'incinération, les cendres sont recueillies dans une urne dont la fourniture est à la charge des familles. Celles-ci sont libres d'adopter la forme et la matière qu'elles jugent convenables, si l'urne doit être placée dans une sépulture de famille. Si les cendres doivent être déposées dans le columbarium municipal, l'urne doit avoir les dimensions suivantes : hauteur 0·28, longueur 0·48, largeur 0·28.

Dans le premier cas, les familles peuvent déposer les urnes soit en concession temporaire, soit en concessions perpétuelles.

Pour ces dernières, elles sont autorisées, si elles le demandent, à n'acquérir qu'une concession d'un mètre superficiel.

D'après les instructions ministérielles, les urnes contenant des restes incinérés ne peuvent être placées à l'extérieur des monuments funéraires ; elles doivent toujours être inhumées, sans qu'il soit nécessaire de les placer à la profondeur des inhumations de corps, il suffit qu'elles soient recouvertes d'une dalle ou pierre dure.

Ces prescriptions, se justifient par la nécessité de protéger les cendres contre une profanation possible ou contre les atteintes du temps, qui renverse tôt ou tard les monuments les plus solides.

Quant au columbarium municipal (voir plus loin sa description sommaire), il ne renferme que des cases destinées à être occupées temporairement. Toute incinération, même gratuite, donne droit à l'occupation pendant cinq ans, d'une case du columbarium; après cinq ans, les familles sont admises à prolonger l'occupation de la case pour une nouvelle période quinquennale moyennant le versement d'une somme de 50 francs. (Cette somme est le prix d'une concession temporaire de 5 ans dans les cimetières parisiens.)

4°. *Tarif des Incinérations.*

Aux termes de l'art. 25 de la loi de finances du 17 juillet 1889, les communes dans lequelles sont installés des appareils crématoires peuvent percevoir des droits pour l'incinération des corps. Les tarifs sont délibérés pour les Conseils Municipaux et soumis à l'approbation du Préfet.

Le Conseil Municipal de Paris, en exécution de cette disposition légale arrêta le 7 Août 1889, une tarification des droits d'incinération qui fut approuvée par arrêté Préfectoral du 27 Septembre suivant.

Cette tarification, un peu élevée, a été modifiée par une nouvelle délibération du 27 Décembre 1889, approuvée par arrêté du 30 Décembre suivant.

Cette tarification est toujours en vigueur, elle est fondée sur le principe admis à Paris, en matière d'inhumation, que les riches doivent supporter les frais des convois pauvres, et que par conséquent la taxe à payer est proportionnelle à la classe du convoi.

Le tarif est le suivant :—

1ère classe	250 francs.
2e „	
3e „	200 „
4e „	150 „
5e „	100 „
6e „	50 „
7e „	
8e „	
Service ordinaire	
Service gratuit	Néant.

Les Maires de Paris peuvent, comme pour les inhumations, accorder par arrêté spécial, la gratuité de l'incinération quand ils estiment que la famille est hors d'état d'en acquitter les frais, alors même que le décédé n'était pas inscrit au bureau de bienfaisance.

En ce qui concerne les corps amenés directement de l'extérieur au monument crématoire, et pour lesquels il n'y a pas de convoi régulier, la taxe d'incinération perçue est celle de la 5e classe. Mais ces corps sont exempts du paiement de la taxe spéciale frappant les corps amenés de l'extérieur aux cimetières de Paris.

De même, les corps exhumés d'un cimetière parisien pour être incinérés sont exempts du paiement de la taxe d'exhumation. (Délibération du 26 Juin 1889, arrêté du 27 juillet 1889.)

La taxe d'incinération est acquittée entre les mains du receveur du cimetière de l'Est à l'arrivée du corps au monument crématoire.

II. Fonctionnement (Monument Crématoire—Appareil d'Incinération—Columbarium).

1°. *Monument crématoire.*

Le monument crématoire de la Ville de Paris a été édifié en 1886–1887 au cimetière de l'Est (Père La Chaise) conformément au projet dressé par M. Formigé, architecte des promenades et approuvé par délibération du Conseil Municipal du 29 Juillet 1885. Il est situé sur le sommet du plateau, et occupe avec ses dépendances, entourées de massifs et plantations, toute la 87e division. Une partie seulement du projet adopté est exécutée. Dans son état actuel, le monument crématoire n'a que le tiers environ de la surface qu'il doit avoir définitivement; c'est la partie destinée à recevoir les appareils d'incinération avec une galerie de dégagement en avant et une salle d'attente pour le public, qui est construite.

La disposition architecturale adoptée est la suivante: le rez de chaussée, ou plutôt l'étage en soubassement est réservé au dépôt du combustible et aux ouvriers chauffeurs; le rez de chaussée contient la salle du public et les deux salles où sont installés les appareils crématoires. Ces trois pièces, dont la centrale est d'une superficie double des salles latérales, arrondies en forme d'hémicycles sont recouvertes de dômes en maçonnerie s'élevant à une hauteur assez grande pour masquer les deux hautes cheminées d'angle. L'ensemble de ces trois dômes vu de l'extérieur est d'un aspect imposant et d'un bel effet architectural.

L'accès se fait par un escalier provisoire installé en face la salle centrale, qui sert actuellement pour le public, et qui, plus tard, lors de l'achèvement du monument est destinée à recevoir un 3e appareil crématoire.

Le monument complet comportera une façade avec rampes d'accès et des bas côtés correspondant aux salles d'incinération, et servant de salles d'attente pour les familles.

Le dépenses de construction, du monument crématoire actuel se sont élevées à la somme de 245,000 francs.

2°. *Appareils d'incinération.*

A.—*Appareil Gorini.*—Au moment de l'inauguration du monument crématoire le 15 Décembre 1887, l'appareil employé, conformément au vote du Conseil Municipal, était un four du système Gorini, du modèle adopté à Milan. Les résultats obtenus lors des expériences poursuivies à l'aide de cadavres non réclamés provenant des hôpitaux étaient identiques à ceux de Milan. Les corps introduits dans l'appareil étaient brûlés, dans un espace de temps variant entre 1¾ heure et 2 heures, et réduits en cendres extrêmement blanches, sans aucun mélange de matières carbonisées, sans odeur et sans fumée. Des résultats analogues ont été

obtenus pour les 13 incinérations qui ont été effectuées dans cet appareil en 1889, lorsque la promulgation du décret réglementant les incinérations a permis d'accueillir les demandes des familles.

Mais dès le principe de graves objections s'élevaient contre l'emploi de l'appareil Gorini ; en premier lieu la durée trop longue de l'opération. Si en effet un délai de 2 heures ne présentait pas de difficultés à Milan en raison du nombre restreint des incinérations, il n'en était pas de même à Paris, où par suite de l'énorme différence de population, et par suite aussi de la résolution prise par le Conseil Municipal d'incinérer les débris d'hôpitaux (3,500 à 4,000 corps par an) au lieu de les inhumer, il était nécessaire d'employer un appareil à marche plus rapide et à fonctionnement continu.

En second lieu, le coût de l'opération, par suite du prix élevé du bois à Paris, était une grave considération ; chaque incinération, coûtant rien qu'en combustible, y compris le chauffage préliminaire du four, de 20 à 25 francs. Aussi l'administration fut elle amenée à chercher un appareil ne présentant pas les mêmes inconvénients.

B.—*Appareil Toisoul et Fradet.*—À la suite de longues études poursuivies par l'administration de concert avec M. Chassaing, Conseiller Municipal, aujourd'hui Député de Paris, elle adopta un appareil au gaz avec récupérateur qui fut construit pour le compte de la ville, par MM. Toisoul et Fradet, et inauguré le 5 août 1889.

Cet appareil comporte : 1°. Un gazogène établi dans le sous-sol et produisant, par la combustion incomplète du coke, du gaz oxyde de carbone qui, allumé à l'entrée du four par des brûleurs spéciaux, produit une température très élevée pour une dépense très minime.

2°. Un récupérateur de chaleur projetant dans le four l'air chauffé par les gaz provenant de l'appareil.

3°. Un four à reverbère, la sole est pourvue de deux entailles permettant le passage des bras du chariot dont il sera question plus loin.

4°. Une cheminée d'appel.

Les résultats de cet appareil sont incontestablement bien supérieurs à ceux de l'appareil Gorini, puisque les incinérations s'y effectuent en une heure ou une heure $\frac{1}{4}$ et que la dépense de combustible ne s'élève pas à plus de 3 francs par opération. Il y a lieu toutefois d'appeler l'attention sur la remarque suivante : La Ville de Paris au point de vue des incinérations n'est pas dans des conditions ordinaires. Ayant à détruire par le feu les restes des 3,500 à 4,000 cadavres par an provenant des amphithéâtres de dissection, elle peut employer un appareil continu, un gazogène brûlant jour et nuit, ce qui réduit sensiblement la dépense des incinérations demandées par les familles ; en effet l'appareil servant exclusivement à la crémation des débris d'hôpitaux, il suffit de suspendre ce service pendant l'incinération du corps amené par les familles, pour le reprendre ensuite quand cette opération est terminée.

Il n'en est pas de même des autres villes où se pratique la crémation, et qui n'ayant qu'à pourvoir à un petit nombre d'incinérations, espacées à des époques plus ou moins éloignées, n'ont aucun intérêt à posséder un

appareil crématoire allumé sans interruption, et doivent en conséquence avoir recours à des appareils intermittents.

C.—*Appareil Fichet.*—En raison même de la nécessité de faire fonctionner continuellement l'appareil crématoire municipal il était nécessaire de pouvoir, en cas d'interruption du service pour cause de réparation, disposer d'un autre appareil de rechange. L'Administration Municipale au lieu de se borner à une copie de l'appareil existant, songea à profiter de l'expérience acquise pour construire un appareil plus perfectionné. M. Fichet, ingénieur civil, qui en collaboration avec M. Muller avait présenté à l'Exposition Universelle de 1878 un projet de four crématoire, s'offrit à édifier un appareil permettant de procéder à une incinération en 15 minutes de moins que l'appareil Toisoul et Fradet.

Cette offre ayant été acceptée, M. Fichet fit, sur l'emplacement primitivement occupé par l'appareil Gorini, reconnu absolument inutilisable, construire un appareil qui a été inauguré le 19 janvier 1891.

Cet appareil se compose comme le précédent d'un gazogène fournissant de l'oxyde de carbone, et d'un récupérateur fournissant de l'air chaud à la chambre voûtée dans laquelle s'effectue l'incinération. La différence, c'est que l'oxyde de carbone ne sert qu'à chauffer le récupérateur, et que la combustion du cadavre s'opère par l'air chaud seul, grâce au volume considérable du récupérateur, bien que selon les besoins, on puisse envoyer dans le four du gaz aussi bien que de l'air. Les résultats obtenus sont bien ceux que se promettait M. Fichet : les corps introduits dans son appareil sont complétement incinérés en 50 ou 55 minutes. La dépense de combustible est un peu plus élevée que celle de l'appareil Toisoul et Fradet (18 hectolitres de coke par jour au lieu de 14).

D.—*Appareil O. André et Piat pour l'Introduction des Corps.*—L'introduction et la sortie des corps dans les deux appareils crématoires ci-dessus mentionnés s'effectue au moyen d'un appareil spécial construit pour la Ville de Paris par MM. O. André et Piat. Il avait été reconnu, quand on employait l'appareil Gorini, qu'une des grosses difficultés du fonctionnement de la crémation consistait dans le retrait de la sole contenant les résidus de l'incinération, en raison des déformations que fasait subir l'énorme température du four tant à la sole elle même qu'aux galets et glissières métalliques sur lesquels elle devait rouler. C'est pour parer à ces difficultés qu'a été établi l'appareil O. André et Piat. Cet appareil se compose d'un chariot monté sur des rails encastrés dans le pancher. À ce chariot massif et muni à l'arrière de contre poids très lourds, sont adaptés en avant deux longerons articulés formant fourchette, sur lesquels on peut placer, soit la sole métallique supportant le cercueil, soit directement le cercueil lui même. Ces deux longerons sont creux et intérieurement remplis d'eau, ce qui empêche toute déformation de la partie de l'appareil à introduire dans le four. À l'intérieur du four sont ménagées sur la sole deux rainures correspondant par leur position et leur profondeur aux longerons de l'appareil introducteur. Pour une incinération, le cercueil étant porté

au fond du four au moyen des longerons qui ont pénétré dans ces rainures, un simple mouvement de déclic abaisse les longerons qui sont ramenés en arrière en laissant le cercueil à l'intérieur du four. À la fin de l'opération, les longerons introduits de la même manière sont relevés et rapportent la sole métallique avec les cendres. Quant à celles provenant de l'incinération des débris d'hôpitaux la sole métallique n'étant pas employée et les cercueils étant placés directement sur les longerons, on adapte à l'extrémité de ceux-ci une raclette métallique, munie à son extrémité inférieure d'un balai de tiges d'acier ; cette raclette étant abaissée quand l'appareil est arrivé au fond du four, amène avec elle toutes les cendres qui sont recueillies à la sortie.

E.—*Fonctionnement de l'appareil crématoire.*—Les détails qui précèdent donnent une idée suffisamment nette du fonctionnement de l'ensemble de l'appareil. Ajoutons quelques mots sur le cérémonial des incinérations.

La salle centrale du monument crématoire, qui sert de salle d'attente pour les familles, se prête par ses dispositions architecturales à des décorations funéraires imposantes. Les tentures varient suivant la classe du convoi adoptée par les familles, mais même pour les incinérations gratuite, la porte donnant accès à la salle d'incinération est drapée d'une tenture noire avec bandeau. À l'arrivée au monument crématoire, le cercueil retiré du char est introduit dans la salle d'attente et de là dans la salle d'incinération où les plus proches parents du décédé, au nombre de trois au plus, sont seuls admis, les autres assistants restent dans la salle d'attente où peuvent être prononcés des discours ou recitées des prières.

Le cercueil est placé sur la sole métallique posée sur les longerons de l'appareil d'introduction ; cette sole est recouverte d'un drap en toile d'amiante. Il est ensuite procédé à l'incinération, dont les progrès sont constatés, au moyen des regards placés sur les côtés de l'appareil Toisoul et Fradet à l'arrière de l'appareil Fichet. Quand la combustion est complète, la sole est retirée, les cendres sont recueillies à l'aide de pinces en métal et deposées dans l'urne qui est ensuite fermée à la chaux et scellée d'un cachet aux armes de la Ville de Paris. Puis cette urne est immédiatement, soit inhumée dans une sépulture du cimetière de l'Est, soit remise à la famille pour être transportée dans un autre cimetière, soit déposée dans une case du columbarium municipal.

F.—*Columbarium.*—Ce columbarium qui vient d'être achevé tout dernièrement (juin 1891) est établi le long du mur d'enceinte du cimetière de l'Est dans le voisinage du crématoire. Cet emplacement a l'avantage de se prêter, d'une manière pour ainsi dire indéfinie, à l'établissement de portiques successifs formant les travées du columbarium. Une seule travée est actuellement construite sur une longueur de 13 mètres 60 c. ; elle contient 354 cases. Celles-ci protégées par un auvent contre la pluie et le soleil, sont à l'abri de toute déterioration, provenant des variations atmosphériques. Chacune des cases, en maçonnerie, a les dimensions suivantes ; hauteur $0^{m}.29.$, largeur $0^{m}.29.$, profondeur $0^{m}.47.$ Sur le devant est ménagée une double rainure ; dans la

première s'encastre une dalle qui ferme la case quand l'urne y a été déposée. Cette dalle est ensuite scellée. La 2e rainure est destinée à recevoir la plaque que la famille voudra y apposer (en métal, en pierre, ou en verre à son choix) et sur laquelle elle pourra placer telle inscription qu'elle jugera convenable, sous réserve, bien entendu, de l'approbation de l'autorité municipale aux termes de l'ordonnance du 8e Octobre 1843. La dépense du columbarium revient à 59 francs par case soit 30 francs pour chaque case (maçonnerie, taille, sciage, feuillure, etc.) et 29 francs pour la partie architecturale et décorative du monument.

III. Statistique.

Il nous reste à exposer sommairement la statistique des incinérations effectuées dans les appareils municipaux depuis leur inauguration jusqu'au 31 juillet dernier.

Rappelons que ces appareils procèdent à l'incinération :—

1°. Des corps dont la crémation est demandée par les familles et autorisée par les maires.

2°. Des débris humains provenant des amphithéâtres de dissection.

3°. Des embryons, ou produits de la conception, venus au monde avant quatre mois de gestation.

État numérique des incinérations effectuées.

Années.	Incinérations demandées par les familles.	Débris d'hôpitaux.	Embryons.	Total.
1889 - -	49	483(1)	217(1)	749
1890 - - -	121	2,188	1,079	3,388
1891 jusqu'au 31 juillet	81	1,669	713	2,463
Totaux - -	251	4,340	2,009	6,600

(1) L'Incinération des débris d'hôpitaux et des embryons ne fonctionne que depuis le 5 août 1889.

Détails relatifs aux Incinérations demandées par les Familles.—Année 1889.—1°. Appareil Gorini.

Age.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Moyenne.
							H. M.
0 à 9 ans - -	1	—	1	1	—	—	0 50
10 à 29 ans - -	1	—	1	—	1	—	1 25
30 à 59 ans - -	5	2	7	—	1	6	1 50
60 ans et au dessus -	3	1	4	—	—	4	1 55
Totaux -	10	3	13	1	2	10	—

2°. Appareil Toisoul et Fradet.

Age.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Moyenne.
							H. M.
0 à 9 ans	3	2	5	5	—	—	0 40
10 à 29 ans	3	2	5	2	2	1	1 0
30 à 59 ans	8	5	13	3	9	1	1 10
60 ans et au dessus	9	4	13	—	11	2	1 15
Totaux	23	13	36	10	22	4	—

Année 1890.—(Appareil Toisoul et Fradet).

Age.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Moyenne.
							H. M.
0 à 9 ans	12	6	18	17	1	—	0 40
10 à 29 ans	5	2	7	3	4	—	1 0
30 à 59 ans	28	14	42	72	30	—	1 2
60 ans et au dessus	34	20	54	10	41	3	1 5
Totaux	79	42	121	42	76	3	—

Année 1891.—Jusqu'au 31 juillet (Appareil Fichet).

Age.	Sexe.		Total.	Durée de l'Incinération.			
	Masculin.	Féminin.		Moins de 60 minutes.	De 1 h. à 1 h. 30.	Plus de 1 h. 30.	Moyenne.
							H. M.
0 à 9 ans	4	3	7	7	—	—	0 32
10 à 29 ans	—	4	4	2	2	—	0 50
30 à 59 ans	27	10	37	25	12	—	0 52
60 ans et au dessus	23	10	33	23	9	1	0 55
Totaux	54	27	81	57	23	1	—

ANNÉE 1890.—CLASSES DES CONVOIS DES DÉCÉDÉS.

Domicile des décédés.	1ère Classe.	2e Classe.	3e Classe.	4e Classe.	5e Classe.	6e Classe.	7e Classe.	8e Classe.	9e Classe.	Totaux. Gratuites.	Parfaites.	Totaux.
10 1ers Arrondts de Paris -	—	—	1	1	11	9	8	4	8	3	39	42
10 derniers, do. -	—	—	1	—	1	3	20	7	23	16	39	55
Arrondt de St Denis -	—	—	—	—	3	—	—	—	—	—	3	3
Do. de Sceaux - -	—	—	—	—	5	—	—	—	—	—	5	5
Hors du Dépt. de la Seine -	—	—	—	—	16	—	—	—	—	—	16	16
Totaux - -	—	—	2	1	36	12	28	11	31	19	102	121

ANNÉE 1891 JUSQU'AU 31 JUILLET.

Domicile des décédés.	1ère Classe.	2e Classe.	3e Classe.	4e Classe.	5e Classe.	6e Classe.	7e Classe.	8e Classe.	9e Classe.	Totaux. Gratuites.	Parfaites.	Totaux.
10 1ers Arrts de Paris -	—	1	1	2	2	7	4	2	9	4	28	32
10 derniers Arrts - -	—	—	—	2	6	6	12	3	12	9	32	41
Arrondt de St Dénis - -	—	—	—	—	2	—	—	—	—	—	2	2
Do. Sceaux - -	—	—	—	—	2	—	—	—	—	—	2	2
Hors du Dépt de la Seine -	—	—	—	—	4	—	—	—	—	—	4	4
Totaux - -	—	1	1	4	20	13	16	5	21	13	68	81

Assainissement des Cimetières.

PAR

MM. BROUARDEL, DU MESNIL ET OGIER.

L'agglomération de la population dans les grandes villes est pour les hygiénistes une source de préoccupations sérieuses.

Il faut pourvoir à la surveillance sanitaire des eaux potables livrées à la consommation, de l'alimentation, du logement, et à l'éloignement des matières usées, à la disparition des corps de ceux qui meurent.

Cette dernière question est particulièrement délicate et la ville de Paris, depuis quelques années, s'en est préoccupée. À cet effet, elle a étudié les moyens d'assainir les cimetières. Les études ont porté à la fois sur l'air, le sol et les eaux dans ces champs de repos.

Dans une première série de recherches, dues à MM. Schützemberger, Carnot, Miquel et du Mesnil, elle a établi :

1° Que si dans le voisinage des anciens charniers, et surtout alors que les inhumations se faisaient dans les églises, on a pu observer des accidents résultant du dégagement des gaz produits par la putréfaction, ces dangers sont devenus absolument illusoires aujourd'hui où ils se répandent à l'air libre; que l'atmosphère des cimetières actuels est pure de tout produit gazeux délétère, de tous les éléments figurés nocifs;

2° Que dans les cimetières actuels le sol ne renferme que de l'acide carbonique en grande quantité, à l'exclusion de tout autre gaz en quantités appréciables;

3° Que la décomposition des cadavres confiés à la terre serait vraisemblablement activée par le drainage du sol.

La seconde série d'expériences a été faite par MM. Brouardel, du Mesnil et Ogier. Elles avaient pour objet d'examiner quelle était l'action exercée sur la décomposition des corps inhumés par des préparations diverses déposées dans les cercueils au moment de la mise en bière, tant pour éviter l'issue des liquides provenant du cadavre que pour masquer les odeurs qui s'en dégagent.

Ils ont étudié ensuite qu'elle était l'influence de l'aération, de l'humidité du sol des cimetières sur la marche de la putréfaction, et ils concluent:

1° Que plus le cadavre inhumé est en contact avec l'air par le fait de la perméabilité du sol, de la porosité de la bière, plus sa destruction est rapide et complète; la présence de l'air favorisant l'éclosion de ces êtres inférieurs, de ces *travailleurs de la mort* qui sont les agents les plus actifs de la destruction des cadavres;

2° Que toute substance mise dans la bière pour en assurer l'étanchéité, sciure de bois mélangée ou non de substances antiseptiques ou simplement aromatiques, poussière de charbon, feuilles de caoutchouc, de carton bitumé doublant la bière, retardent dans une proportion considérable la destruction des cadavres.

Toutes ces matières s'opposent au développement des animalcules la plupart aérobies qui paraissent être agents les plus actifs de la destruction des cadavres;

3° Que l'inhumation dans un sol humide ou imperméable retarde considérablement la putréfaction.

En conclusion, M. Ogier (au nom de MM. Brouardel, du Mesnil et Ogier) présente ensuite quelques observations sur les circonstances qui empêchent spécialement la destruction des cadavres. Il cite comme exemple le cimetière de St. Nazaire établi dans la terre glaise, presque complètement imperméable à l'air, où les cadavres ne soubissent qu'une décomposition excessivement lente. L'établissement d'un système de drainage, amenant l'air au contact du cadavre, tel que le système appliqué par M. Coupry à St. Nazaire, produit de bons résultats et accelère, dans des proportions énormes, la destruction du cadavre. C'est ce que montrent les photographies des exhumations récemment faites dans ce cimetière.

DISCUSSION.

Sir Spencer Wells, in answer to Mr. Seymour Haden's objection that cremation was "unnatural," contended that it was not more so than burial in the earth or in the sea. Everything depended upon what was meant by the term "natural." He told an anecdote of Sir James Simpson, who suggested to a lady the use of chloroform during her approaching confinement, but was met by the same objection—that "it was so unnatural." Finding that she had come from Belfast, and by steamer, Sir James at once retorted that this also was a most "unnatural" deviation from the "natural" method of crossing, namely, by swimming.

Rev. F. Lawrence (Vicar of Westow, York) spoke as Honorary Secretary of the Church of England Burial Reform Association. The mode of disposal of the dead which the Association advocated was that of "earth to earth," indicated in the Burial Service, and advocated by Mr. Seymour Haden. The Burial Service orders the priest and clerk to meet the corpse (no mention is made of a coffin), and to go before it either into the church or towards the grave. The church is not to be entered at all if there be any reason (such as possibility of danger to the living) to the contrary. Arrived at the grave-side, the body (again no mention of a coffin) is to be made ready to be laid into the earth—not into a bricked grave, or catacomb—the words of committal being: "We "commit this body to the ground, earth to earth, ashes to ashes, dust to "dust." During the service are to be said the words, "Thou sowest not the body that shall be," thereby indicating that the resurrection body will not depend for its identity upon the material particles of which the body consists at the time of burial. Last scene of all, the earth is to be cast upon the body. Such was the ancient mode of burial. Bodies were buried in the plain earth in linen or woollen. Churchyards so used were grave-crematoria, wherein the dead were reduced to their ultimate elements by the action of the earth and air, aided by the micro-organisms which abound in the living earth. This went on for a thousand years, but in the 17th century a gross system sprang up. In utter disregard of the rubric, the body was buried in a durable coffin, to the exclusion of the purifying influence of earth and air, with the result that town churchyards became noisome centres of pestilence, and were closed by Act of Parliament. The suburban cemeteries, strange to say, were conducted upon the same pernicious principles. Boxing up of animal putridity has been carried on to such an extent that at this moment there are 1¼ million dead bodies around London—not buried, but simply boxed up to seethe in their own corruption, generating poisonous gases which no 'hermetical' sealing can effectually restrain. Mr. Seymour Haden startled the world with his memorable letters, and the Necropolis Company, in accordance with his suggestions, established the Brookwood Cemetery, a tract of land beautiful in situation, and of suitable soil, calculated to serve for the burial of the dead of London for all time to come. Sir Henry Thompson, despairing of effectual reform by any other means, advocated drastic measures, and the community had to thank him for emphasizing the truth that the disposal of the dead is in the main a sanitary question. Sir Spencer Wells had shown that (as was taught by Bishop Butler) our gross organised body formed no part of our real selves, that the dead body was not the person who had died, and that no mode of disposal of the dead could affect in the slightest degree the doctrine of the resurrection. The Church had founded an organisation for

bringing the nation back to the simple earth-to-earth burial, and to this end sermons had been preached, and meetings held at home and abroad. The Archbishop of Canterbury had urged the use of perishable coffins. Returns had been obtained from Parliament respecting metropolitan and provincial cemeteries, and the Government had been asked to concentrate in one department the control over burial-places now divided between the Home Office and the Local Government Board. Memorials were being prepared for presentation to the Prime Minister, the Royal College of Physicians, the Royal College of Surgeons, and the British Association. On behalf of the Burial Reform Association, he asked for the earnest co-operation of sanitarians with a view to banishing indifference, irreverence, and ignorance, and to introducing a mode of burial which shall be harmful to none.

Dr. Ebenezer Duncan (Glasgow) said that the Scottish Burial Reform and Cremation Society combined the objects advocated by the Church of England Burial Reform Association and by the Cremation Society. The reason for the existence of the society which he represented was the extensive prevalence of the insanitary and objectionable method of pit-burial in Glasgow and other Scotch towns. As an example of the danger of this, he mentioned the case of the Glasgow Royal Infirmary, where a surgical pavilion had inadvertently been built on the edge of an old cholera pit. The outbreak of hospital gangrene and pyæmia in the wards of that pavilion led to the examination of the cholera pit. The bodies were found to be partly converted into adipocere, partly in a state of advanced putrefaction. Many had been buried without coffins, and yet after 30 years they remained only partially decomposed. In Glasgow there were 19,000 interments annually, and about 9,000 of these were in pits and common graves. It was impossible for the poor to pay for separate graves, and it was undesirable, from the economic point of view, to set aside such a large amount of ground in proximity to crowded cities as would be necessary for that purpose. It was proven that crowded graveyards polluted the subsoil water and the soil which was needed for building purposes, and they drained into neighbouring sewers and watercourses. On all these grounds Dr. Duncan and the Scottish Society held that cremation was to be preferred to burial as the method of disposal of the dead of our large towns. As a teacher of medical jurisprudence, he held that the precautions adopted by the Cremation Society of England were quite sufficient to prevent any criminal abuse of the process.

Dr. H. Franklin Parsons, while appreciating the advantages of cremation, especially as regards economy of ground, thought that the dangers of interment, if properly conducted, had been overstated by the advocates of cremation. He believed that danger to health arose rather from corpses being kept unburied, and that a body surrounded and covered by a mass of suitable earth was not a source of danger to the public health.

Dr. A. Brett (Watford) mentioned an instance in which the body of a person dead of small-pox was carried to the grave by four bearers, of whom three only had been vaccinated; the fourth caught small-pox and died. Dr. Brett expressed strong approval of the process of cremation, which he had seen carried out at Woking.

Mr. W. P. Buchan (Glasgow), as a practical sanitarian, advocated cremation as being the only sure means of disinfecting the dead body.

He considered the objections of Mr. Haden to be purely imaginary, since greater precautions as to verifying the cause of death were adopted before cremation than before burial. Cremation was also a safeguard against desecration of the body at later periods. He cited a case in which, by the opening of a grave, portions of a dead body were thrown out with the soil, and a dog ran off with a bone to which human flesh was still adhering. The question was not a religious but a sanitary one, and those who wished to be cremated had as much right to demand it as those who desired ordinary burial.

Surgeon-Major John Ince challenged the self-styled sanitarians to show that cemeteries were dangerous, remarking that parsons, gravediggers, and others whose duties connected them with such places were at least as healthy as other men. He regretted that the shortness of time allowed for discussion prevented his proving that the whole system of so-called sanitation was a tissue of rubbish and fallacy.

Dr. S. W. Abbott (Secretary of the State Board of Health of Massachusetts) mentioned that, in the year 1885, cremation was legally sanctioned in Massachusetts. The same law referred the plans and conditions of cremation to the State board of health. The question of crime was settled by referring each case of proposed cremation to the medical examiner of the district, who was authorised to give a certificate of death in every case of proposed cremation, and to conduct an autopsy if he considered it necessary. The coroner's inquest was abolished by law in 1877. The medical examiner had superseded the coroner.

Dr. E. F. Willoughby (London) contended that cremation revealed rather than concealed crime. Under the Italian law, in cases of cremation, a *special* medical certificate, having the sanctity of an oath, was required in addition to the ordinary medical certificate. The former (confirmed by autopsy and analysis where requisite) must state that there is no possible doubt as to the cause of death being natural. By this means a case of accidental poisoning by sweets coloured with copper was detected at Turin. The sweets were traced and seized, after having given rise to non-fatal "enteritis" in others.

Sir Henry Thompson, in replying, said that he needed to refer to one point only. Mr. Haden had said that cremation was a direct incentive to crime. This was not so. On the contrary, cremation was a preventive, if, as at Woking, it was carried out only after a thorough inquiry into the causes of death. As to the medico-legal argument, inquiries from over 300 coroners had shown that in the course of 20 years in England and Wales only 100 exhumations had taken place for medico-legal purposes, and out of that number only 20 (or one per annum) had been exhumed for suspected poisoning. For this small matter it was suggested that 70,000 bodies dying of infectious disease every year should be allowed to contaminate the ground. He pointed out that the soil was very scarce in which burial could properly take place. With due precaution and inquiry into the cause of death, cremation was the only solution of the difficulty as to the disposal of the dead.

Mr. Seymour Haden, in replying, referred to Sir Henry Thompson's statement that during the last 20 years exhumations for suspected poisoning averaged only one per annum, and pointed out that the number of such suspected cases would increase if cremation were generally adopted, since the incentive to destroy by poison would be greater in

proportion as the chances of detection were diminished. Referring to the statement that it was desirable to disinfect dead bodies by chemical agency, he declared that the earth was the best and most available disinfectant, and instanced as a proof of its sufficiency the successful use made of it to stamp out cattle disease. Answering the objection that the poisoning of the watercourses in the neighbourhood of graveyards was inevitable, he cited the case of the Aldgate pump, situated close to a graveyard, as showing that a few feet of earth were sufficient, by changing its chemical composition, to deprive the foulest water of putrid matter contained in it.

(**Mr. Ernest Hart** here said that the Aldgate pump had been closed at his instigation, because of the deleterious properties of the water.) Mr. Haden insisted, however, that that very case afforded a remarkable example of the power he was claiming for the earth of depriving water of animal matter contained in it.* Mr. Haden concluded by referring to the little value, in cases of poisoning, of the medical certificates relied upon by the cremationist, even when based on *post mortem* examination, since such examination to be effectual often involved the chemical analysis of remote organs and tissues, and therefore required not hours but weeks for its performance.

At the close of the discussion, Sir Henry Thompson moved, and Mr. Ernest Hart seconded, the following *Resolution* :—

> "That the cremation of the dead is a rational and hygienic procedure, which is especially called for where death occurs from contagious disease."

This was carried by an overwhelming majority, with only four dissentients.

The following *Resolutions*, proposed by Mons. George Salomons, and seconded by Mr. Lithiby, were then put to the meeting, and carried by similarly large majorities :—

> "Le Septième Congrès Internationale d'Hygiène confirmant les vœux des Congrès Internationaux d'Hygiène qui l'ont précédé demande :

---

* Mr. Seymour Haden has supplied the following quotation from the appendix to a report by Sir John (then Mr.) Simon, medical officer of the Privy Council, relating to the water of the Aldgate pump.

"The water from this well is perfectly bright, clear, and even brilliant; it has an agreeable soft taste, and is much esteemed by the inhabitants of the parish, though, as will be seen by the subjoined analysis, it is an exceedingly hard water, and the large quantity of earthy salts it contains renders it unfit for all culinary and most domestic purposes . . . . (yielding carbonates of lime and magnesia, sulphate of lime, chloride of sodium, nitrates of potash, soda, magnesia, and ammonia, silica, and phosphate of lime; but of organic matter, none or scarcely a trace). . . . . The quantity of nitrates in this water is very remarkable. These salts are doubtless derived from the decomposition of animal matter in the adjacent churchyard. Their presence, conjoined with the inconsiderable quantity of organic matter which the water contains, *illustrates in a very forcible manner the power that the earth possesses of depriving the water that percolates it of any animal matter it may hold in solution*; and, moreover, shows in how complete and rapid a manner the process is effected. In this case the distance of the well from the churchyard is little more than the breadth of the footpath, and yet this short extent of intervening ground has, by virtue of the oxydizing power of the earth, been sufficient wholly to decompose and render inoffensive the liquid animal matter that has oozed from the putrefying corpses in the churchyard." (Second annual report on City of London (1850), Appendix p. 170.)

"1e. Que les gouvernements fassent disparaître les obstacles législatifs qui s'opposent encore à la crémation des cadavres.

"2e. Qu'ils avisent à organiser la crémation des cadavres sur les champs de bataille."

The Statutory Education and Registration of Architects.

BY

W. Howard Seth-Smith, President of the Society of Architects, and Fellow of the Surveyors' Institution.

I should not have trespassed upon your time by accepting the invitation of the Council of this Congress to read a paper upon the subject of the Statutory Examination and Registration of Architects had it not been for a very strong conviction that both the health and wealth of the community are largely dependent on the success of the endeavour to obtain such a measure. The differences of opinion in our profession are not on the question as to whether a more systematic and thorough training is required; all, I believe, admit that education is the basis of progress; the dispute is as to whether any test of the training should be applied, and if so, whether that test should be optional or compulsory. In the ranks of architecture there has happily arisen a strong reaction against the easy-going commonplace and imitative spirit—a dead set against the assumption that a man who is well qualified in planning, construction, and sanitary science is an architect apart from his possession, or non-possession of designing power, a cultivated taste, and skill in representing his ideas on paper. We affirm, and we challenge contradiction on this point, that, failing the art qualification, a person has no right to the title of architect. The recent correspondence in "The Times" will however have revealed the fact that a certain section of the profession (I believe a very small section, but one which includes a few eminent architects) holds that architecture has for some time been less constantly associated with the sister arts of painting and sculpture than is desirable; that examinations and diplomas, by raising artificial barriers, would have a tendency still further to alienate these branches of art; and moreover that artistic qualifications cannot be brought to the test of examination. None will be found to dispute one of the statements of fact upon which these gentlemen base their opinions, namely, that architecture has hitherto been too little associated with pure art; but not only have the leading professional bodies repudiated their deductions, but the success attending even the present examinations of the institute (which by the way are voluntary excepting as regards applicants for membership of that body, and are conducted by honorary examiners) has proved that some test of knowledge is a keenly felt need, whilst the improve-

ment from year to year in the quality of the candidates for examination and the progress of designing power since the institution of these examinations, is, we are assured, so far encouraging.

Those who oppose the establishment of examinations have, in their efforts to emphasize an important truth, lost sight of the first and foremost principle which regulates architectural employment, the principle, namely, that our opportunities of practice are dependent upon the confidence of the public in our qualifications.

Our eminent friends' enthusiasm for the art side of our calling is ascinating and contagious, and this fascination is so irresistibly felt by many young students and budding architects who have not the ballast of an average professional experience, that it constitutes a very real danger to the future of architecture: for let us remember:—1. That a man is not necessarily any the worse designer because he is an accomplished constructor. 2. That we cannot regulate the training of the profession generally on the lines of the experience of a dozen exceptionally able men who have attained distinction (in spite perhaps of an imperfect training in constructive and sanitary science) by the sheer force of their originality and skill as designers; it is absurd to say that such men would have been excluded by the proposed tests; we must deal, as in all other professions, with the average man, and establish a curriculum which will raise the standard of the craft generally.

Who are the men who obtain the largest practice? Obviously those who combine with considerable artistic ability exceptional technical knowledge and capacity for the multifarious business of which every architect's practice is, and must ever be, largely composed. But very many men whose works declare them to be absolutely devoid of taste or power to design, manage to obtain and uphold a good practice. Why? For the simple reason that every client can recognise business and constructional ability, but comparatively few can discriminate between good and bad design; hence the great importance of an art test as a qualification to practice, if our British architecture is to make progress.

In an applied art, which is as costly as it is unalterable, the matters of primary importance to the public must ever be good planning, economical and sound construction, durability of material, excellence of the drainage, water-supply, ventilation and heating arrangements. Do not the foundations of the practice of most architects rest mainly n the confidence of our clients in our knowledge of these things? And this remark applies even more forcibly to the majority of our provincial friends, and more still to those who fill the posts of architects and surveyors to the urban and rural authorities, county councils, &c., nvolving as they do, such great responsibility for the health of the public. Once satisfy the public that we are competent to supervise all branches of the building trade, and in other matters of business in connexion with contracts, and building regulations, to safeguard their nterest, and you have at once created a basis of employment in which your art acquirements will find their proper opportunities.

Why do the public so often apply to builders direct for much important work instead of through architects? unquestionably, because

they do not believe the scientific attainments of the latter are, as regards construction, superior, if equal to those of the builder, and they are keen enough to know that rule of thumb is not economical where science, even with art added, would be so.

What then would be the natural result of the anti-examination movement, but that employers would go to the builder in the first place, and that the builder would employ, if need be, the architect to decorate his plan and construction. I wonder if the memorialists realise this, and, if so, how they relish the prospect in the interests of architecture? They made an admirable suggestion in one of their letters to the "Times," viz., that builders should be registered as a protection to the public. But let us be consistent; can we allow that builders and plumbers should be examined and registered as skilled constructors, while we, who profess to be competent to supervise their work, and moreover, take commission on the operation, possess no credentials of any kind?

Having thus shown the fallacy of the opposition to the tests in the science department of our craft, I now ask your indulgence for a moment longer to consider the art question in relation to examinations. And at the outset I submit most emphatically that if both taste and its expression can be tested sufficiently to qualify for the Royal Academy, and other art schools, they can surely be tested well enough for architectural practice, and to prevent in the near future the costly disappointments in design which have had almost as much to do with the existing discredit and suspicion in which the profession is frequently held, as has the want of scientific training. An architect may have noble ideas, and a sense of beauty which may lead to his employment, but if he lack sufficient skill to convey his ideas to the mason and the carver, the most costly features in his work will be a disgraceful and standing failure; —in other words, the architect must be a draughtsman of no mean skill. Is it impossible or inexpedient to require an examination test of his skill?

I hope I have been able, so far, to show that examinations, both in the science and in the art of architecture, are possible and necessary. It remains for me only to show that a voluntary system of examinations, however well arranged (and this by unpaid examiners) is insufficient to bring about the general qualification of architects.

One might adduce many arguments, which will, however, be found well stated in the various publications on this subject,* and I will confine myself to pointing to the experience of the Institute as the leading corporate body of the profession. After many years of discussion and postponement of the question, the Institute decided that examinations were necessary, and that so far as its own membership was concerned, no voluntary system would be sufficient, that is, to

* "The Proposed Act," a paper by Hugh Roumieu Gough, F.R.I.B.A., 1888; "The Legal Registration of Architects," by J. Wreghitt Connon, F.R.I.B.A., 1888; and "The Proposed Statutory Registration of Architects," a paper by W. H. Seth-Smith, 1886, &c., &c.

establish confidence on the part of the public in the qualifications of every member. It was accordingly determined that after a certain date the door must be closed to all, excepting to those who could pass examinations. But the Institute recognised the fact that it would be unfair to exclude those who had established a practice under the old system, and they were accordingly invited, in the interval, to join the ranks in all grades of membership.

The objects sought by, and the principles proposed to be applied in, statutory registration are precisely those which led the Institute to establish test examinations, and then at a given time to close its doors, and we wait still to hear one reasonable argument adduced to prove that it is less desirable to apply these principles to the larger body, namely, to the profession generally, than to a body numbering not more than one-tenth of the architects of the United Kingdom, or that the operation is a difficult one. I am aware that statements have been made to the effect that the measure proposes to admit to registration, in the first instance, every person claiming such recognition, but I need only refer you to the forms of declaration on oath printed at the end of the Bill now before Parliament (which every person applying for registration would have to sign) in order to refute this flimsy misrepresentation. But one more word on the term registration. There is a very natural repugnance on the part of highly qualified and experienced men to be registered with a number of very indifferent practitioners, men who do not blush to put up on their doorplates—"Builder, Architect, and Undertaker"; but are not names, good and bad, found in the same columns of the directories? And let us recollect that when once the wall of defence is by examination erected round the profession, the degrading elements will cease to invade us; the young blood is all of good quality, while the incapable men gradually die out.

On the 31st of May 1890 the Institute carried a resolution in the following terms:—"That while not opposed to the principle of com-
"pulsory examinations as applied to those about to practice architecture,
"the Institute is of opinion that the difficulty of restricting, by statutory
"powers, the practice of architecture to those who have passed an
"examination is at present so insuperable that it is undesirable to make
"an immediate application for such powers."

What does this resolution amount to but the admission that the principle of the movement is a good one, and that if the difficulties could be overcome an Act should be passed at once?

That both the resolution and the discussion produced this impression on the minds of architects generally is proved by the wording of the memorial to the Institute published in the "Times" and alluded to in the opening of this paper. And it is equally clear that as the present Bill never for a moment contemplated the absolute restriction of practice to those who had passed the examination, but merely aims at enabling the public to discriminate between properly qualified and unqualified persons, the "insuperable difficulty" does not and never did exist.

But I incidentally referred just now to the architects and surveyors holding public appointments under the municipal, urban, and rural authorities, and it may interest you to learn how the present measure proposes to deal with the immensely important point of their proper qualification; clause 28 makes it unlawful for "any city, borough, or "township, urban or rural authority, county council, vestry, or board "of works, to appoint any unregistered person to any office in the "performance of the duties of which he shall have to prepare, examine, "approve, or pass plans of buildings and their constructional or sanitary "arrangements; or to examine or report upon buildings erected or to "be erected, so far as concerns their structural or sanitary arrange-"ments, or so far as concerns their safety from fire or their convenience "of exit or entrance, or as far as concerns buildings which are or are "alleged to be dangerous structures." "But in cases where such "appointments are held at the passing of this Act by persons not "qualified to be registered under this Act, such person may register "within six months of the passing of this Act by virtue of them "holding such appointments."

I will not now do more than hint at the immense impetus which such a provision would incidentally give to architecture, but will close by giving one or two reasons why Parliament may be expected to pass such a Bill. Firstly, there are, as precedents, about a dozen Acts registering other professions; secondly, the State, in granting a charter conferring upon the Institute the right to examine on these lines, has admitted the principle for which we contend; thirdly, that without the creation of a general council of education such as any Act of Parliament would create, the public can have no guarantee that the Institute's examinations constitute a satisfactory test; fourthly, that until the State has secured the qualification of the 10,000 architects of Great Britain, whose proper function it is to devise and to superintend the sanitation of the dwellings of the community, it is preposterous (I use the term in its strictly etymological sense) to pass enactments to promote, or to impose penalties for the breach of, the sanitary condition of our houses; fifthly, that the law has already provided for testing the qualifications of our metropolitan district surveyors; sixthly, that the measure we seek would not (as do most other Bills protective of public health) increase the officers salaried out of the rates and taxes, but would simply qualify the existing staff at its own charges.

Mr. Seth-Smith then proposed the following *Resolution*, which was seconded by Dr. George Reid (Stafford):—

> "That this meeting cordially approves the principle of the statutory examination and registration of architects in the interest of the public health."

DISCUSSION.

Mr. Arthur Cates, V.P.R.I.B.A. (London), who spoke at the invitation of the Chairman, agreed with much that Mr. Seth-Smith had said, but considered that the object of the paper was to support the Architects' Registration Bill lately before Parliament. The only ground upon which the question could be justly considered in this Congress was that indicated in the clause (28) of the Bill which had been read by Mr. Seth-Smith, and which provided for the qualification of certain public officers. Such a question might properly be dealt with by the heads of the State, but should not be introduced in a Bill promoted by private persons. The Institute of British Architects had long pressed on the Government the necessity of legislation to secure adequate qualification of officers holding sanitary appointments, and had itself held efficient examinations; but the Bill should not obtain the support of the meeting merely because of that clause. He thought that the general question raised was not suitable for the consideration of the section. The chartered representative body of the architects' profession had resolved that the time had not come for proceeding with registration. The question was one for discussion by the profession whose interests it most closely touches. That profession was only now being formed, and until it had become further advanced and consolidated registration was inexpedient. Almost insuperable difficulties attended the operation of registration, and these were demonstrated by the progress of the Bill, which first proposed to include engineers and surveyors as well as architects. The two former were excluded at the instance of their respective institutes. The legitimate ambition of architects was to attain to the dignity of R.A., *i.e.*, "Royal Academician." The Bill, if passed, would create 10,000 R.A.'s—"Registered Architects." In conclusion, he urged the meeting not to intervene in a strictly professional matter, and not to pass a resolution intended to support a Bill which, in the opinion of many prominent members of the architect's profession, would be detrimental to the best interests of the profession and the art.

Mr. Mark H. Judge, A.R.I.B.A. (Paddington Vestry), did not think that Mr. Seth-Smith had made out a case for limiting the practice of architecture to persons possessing diplomas of efficiency and registered under Act of Parliament. The private practice of architecture could not be compared with the practice of medicine. In the latter, all was dependent on the skill and knowledge of the medical man; but in the former there was a supervision on the part of the State (through public surveyors) whereby the public were protected in all essential matters. Were the case otherwise, there would be much to say in favour of the registration advocated by Mr. Seth-Smith. With regard to public officers he agreed with what Mr. Cates had said; he thought it time that steps were taken to protect the public against the appointment of incompetent officers, and Mr. Judge concluded by proposing the following *Resolution*:—

> "That in the opinion of this Section of the Congress, architects ought to be registered as to qualification before being eligible for any public appointment."

This was seconded by Mr. W. J. Fletcher, F.R.I.B.A., of Wimborne.

Mr. Seth-Smith briefly replied, after which the two resolutions were put to the meeting. That proposed by Mr. Mark Judge was carried without a dissentient. That proposed by Mr. Seth-Smith was carried by a majority of eight, the numbers voting being 22 for and 14 against; several of the members present did not vote.

The Education, Training, and Status of Sanitary Inspectors.

BY

GEO. REID, M.D., D.P.H., Medical Officer,
Staffordshire County Council.

The local sanitary administration of this country is conducted by district authorities or boards, who are appointed by the rate-payers. In extent, the districts, both as regards area and population, vary considerably, and they are classed as urban and rural, the distinction being dependent broadly on the density of the population.

Recently, County Councils have been instituted, to whom certain limited sanitary powers have been intrusted over large areas embracing a number of authorities, and the whole organisation is under a controlling central authority, the Local Government Board.

The district authorities appoint medical officers of health, who are their responsible advisers on matters relating to the health of the people. In addition to these, inspectors of nuisances, or, as by preference they might be called, sanitary inspectors, are appointed; and it is with the education, training, and status of these latter officers that this paper is concerned.

By way of economising time, and for the information of those present who may not be familiar with the duties of a sanitary inspector, I would compare them with those of a police officer, substituting disease in one case for crime in the other. A little reflection on these lines will convey an idea of the varied, the responsible, and in many cases the dangerous nature of the calling; and it will at once become apparent that special knowledge, training, and experience, are indispensable requirements in such an officer. To efficiently discharge his duties it is essential that, intellectually, he should at least be entitled to take an average place, and that, technically, he should possess, at any rate, an elementary knowledge of the various conditions upon which the hygienic well-being of the community is dependent, including the physical law, that govern all sanitary operations.

An inspector then ought to know enough of physics in relation to air and water to enable him to understand the principles upon which proper ventilation, warming, water-supply, and drainage are dependent. He ought to be familiar with physiology to an extent that will make intelligible the influence that impure air, impure water, and general insanitary surroundings exercise on the usual healthy functions of the body. The conditions upon which the origin and spread of infectious disease are dependent, and the best means of counteracting these, ought to form a part of his stock of knowledge. As a guardian of the food-supply, it is necessary that he should be able to recognise unsound meat, a duty which entails a knowledge of the diseases to which animals are liable, and the signs of these in the carcass, as well as of the evidence of putrefactive changes in food, both animal and vegetable. The operations of certain

trade processes that are likely to give rise to nuisances must be known to him, so that he may advise his authority of cases in which the law that governs these is being abused. And lastly, he must know the provisions—so far as they relate to his duties—of the Public Health and other Acts that govern the sanitary administration of the country. In short, if the detailed duties of a sanitary inspector mean anything at all they entail the possession by him of an amount of technical knowledge that, as I have already remarked, can only be acquired by special study and training. To this technical knowledge must be added a good general education that will enable him to properly keep the necessary books and records; and by no means the least important of his requirements are tact and common sense.

It is such a man, and only such a man, who can be of real service as the right hand of the medical officer of health whose instructions it is his duty to carry out.

I would here remark that in England, as regards the relationship of the two officers, this is the inspector's recognised position; and, from the nature of his duties, it is difficult to conceive how it could well be otherwise, although in Scotland it would appear to be so. There the two offices have hitherto, theoretically at any rate, been looked upon as distinct and independent; and, only recently, the relative position of the officers has been the subject of considerable discussion in that country, a body of sanitary inspectors having petitioned against the adoption by a county authority of certain byelaws, with the result that the byelaws in question, which sought to establish the same relationship between the medical officer and inspector as is recognised in England, were modified to an extent which, unfortunately, leaves matters much in the same position as before.

One of the arguments used by the petitioning inspectors was, that by reason of the two offices being independent, in the event of the action of the inspector being questioned the medical officer could with greater force be appealed to in his support. This, to my mind, is one of the strongest arguments against the proposition, for, supposing the medical officer's views should differ from those of the inspector, the authority, in the conflict of opinion, would have to act for themselves. What, too would be the effect of such independence in large districts under one medical officer, but under several inspectors, each differing from the others, possibly, in the advice given to the sanitary authority with regard to similar conditions?

Time will not allow of more detailed argument with reference to this branch of the question. I have introduced it, in the first place, in order to give any Scotch medical officers or inspectors who may be present an opportunity of ventilating their opinions in discussion afterwards, and secondly, by way of protest against the establishment of a principle which, in my opinion, is essentially opposed to ideal sanitary administration. There must be no dual responsibility; otherwise, sooner or later, difference of opinion and consequent friction is certain to arise.

In order to ascertain the present position as regards the details of administration for inspection in the various sanitary districts of England,

I recently sent circulars to each inspector in Staffordshire—including those of county boroughs—containing questions with reference to the previous position and training, salaries, duties, and conditions of appointment in each case. I selected Staffordshire, partly because of my official connexion with the county, and partly because of the fact that its population is both agricultural and manufacturing. In addition to this, I obtained the same information from a town of upwards of 400,000 inhabitants, which may be taken as an example of most large towns. This information has been condensed into tabular form for convenient reference; the details, however, are too numerous to admit of more than a cursory analysis.

In the first place, with regard to urban districts (Tables I., II., III., and IV., *post*). In the case of the large town (Table I.) selected as an example, there is a head qualified inspector who receives a salary of 250*l.* a year, and included in his duties is inspection under the Sale of Food and Drugs Act. He has 23 assistant inspectors under him, whose duties are distributed as follows:—Health department 16, smoke department 4, dairies, cowsheds, and milk shops 1, canal boats 1, and lodging-houses 1; they are not qualified, and they receive from about 70*l.* to 90*l.* a year.

In the four towns with populations exceeding 50,000, it will be found on referring to Columns 3, 6, and 7, that in one case the sanitary inspection is in the hands of one man, in two cases there are two inspectors, and in the other the duties, including inspection under the Sale of Food and Drugs Act, are divided among three. The salaries in these cases range from 104*l.* to 140*l.*

In the next group, consisting of five towns with populations of under 50,000 and over 30,000, the conditions, except with regard to assistance, are very much the same.

In the following group (Table II.), composed of five towns with populations of between 20,000 and 30,000, while the salaries are about the same, the duties are increased by extraneous work.

Excluding the large town then, it may be said that the salaries in towns of under 50,000 and over 20,000 amount to about 2*l.* a week—the wages of a skilled artizan.

Further down in the table, among the smaller towns, the salaries paid are extremely erratic in amount, and extra duties of a varying nature are imposed. Take for example No. 18, a town with a population approaching 20,000 where the inspector receives 35*l.* a year, as compared with No. 35, a town with under 6,000 inhabitants where the inspector's salary is 80*l.* a year. The contrast is still more marked owing to the fact (Column 7) that, in the former case the salary is made up to 95*l.* by the additional appointment of rate collector, while in the latter it is supplemented to 365*l.* in payment for extra work as surveyor, engineer of a water-works, and inspector of a rural district, and as in this case the officer has to provide himself with assistants, doubtless, the salary paid is not more than the work deserves.

The last example I would call attention to is the district last on the list (Table IV.) where the inspector is also rate collector at a joint salary of 35*l.* a year.

In less than one half of the districts only, is the tenure of office permanent.

As shown in Column 10, in only nine out of the 39 examples did the inspector possess any knowledge of his duties previous to his appointment, and in only three instances are any definite conditions as to previous knowledge imposed on candidates although, it is but fair to note, that in many cases no recent vacancy has occurred, the present officers having held their appointments for many years. In the case of those districts in which appointments have been made within the past five years we find that of 17 such (excluding one for which there is no return) only in six did the inspector possess any knowledge of his duties.

With regard to the previous occupations of inspectors (Column 11) they are too varied to enumerate. Policemen, rate collectors, clerks, and farmers form the bulk of them.

In addition to the information given in the table, my inquiry included the following question:—"Are you of opinion that you can "efficiently discharge your duties as inspector, or, do you consider that "your district is too extensive, or, that other duties (if you have any) "occupy too much of your time?" For obvious reasons I have not included in the table the answers given to this question, but I may state that out of 17 replies from towns with over 15,000 inhabitants, 12 inspectors admitted their inability to perform their duties, the reason given, in four instances, being, that the supervision of refuse-removal (work which might well be intrusted to an assistant) occupied too much of their time.

That so many negative replies to this question should have been received is not surprising when we find (Column 8) that the range of population intrusted to one man—without the imposition of other duties—varies from above 50,000 to about a quarter that number, showing, either, that in the one case the work is excessive, or, in the other, too small. So much for urban districts.

With regard to rural districts (Tables V. and VI.) I have taken area in place of population as a basis for classification. Columns 3, 6, and 7 indicate, that the salaries paid vary greatly without regard to the size of the districts; also, that in a large proportion of cases, other duties, such as those of inspectors of urban districts, rate collectors, school attendance officers, vaccination officers, &c., are combined. In four instances only is this not the case, and, oddly enough, two of these, namely 17 and 18, are the smallest districts.

In many cases too, the emoluments from extraneous work form the greater portion of the joint salaries. In the case of three districts, namely, 9, 14, and 16, not only is other work allowed, but no limit seems to be placed upon it, the additional occupation in one case being "various," in another that of an architect, and in the third that of a house and estate agent.

In no cases are travelling expenses provided.

In every case the County Council grant is taken advantage of.

In one case only (No. 11)—which embraces the appointment of surveyor and inspector of an urban district—is any specified previous knowledge required; and again, as in urban districts, the men selected have usually been policemen, farmers, clerks, &c.

In replying to the question whether the duties can be efficiently performed, no fewer than 10 of the 18 rural inspectors answer in the negative; some calling attention to the fact that other duties occupy too much of their time, although, at the same time, they say that if these were taken away little would be left of the inspector's portion of the salary after paying expenses. To put the matter plainly, the views of the local authorities may be expressed as follows:—"There are certain "appointments that must be made involving duties that must be done. "Here is an appointment, the duties of which are less defined; let us "tack it on to the others to make up one man's salary, and, if he has any "spare time after doing his regular work, he can devote it to sanitary "inspection."

So far as I have been able to ascertain, the sanitary administration for inspection in other countries does not admit of comparison with that in England. In Germany, for example, lay inspectors do not exist—except for the purpose of factory inspection—the general sanitary administration being in the hands of specially qualified medical officers, who are appointed for life by central governing bodies. In addition to the supervision of everything connected with the care of public health, they have other duties to perform, such as public vaccination, medico-legal inquiries, and official visits to schools, prisons, private lunatic asylums, and hospitals.

The details of organization in one State differ from those in another. The kingdom of Saxony, for example, is divided into 34 "medical districts," varying in extent from 740 to 222,300 acres, and from 9,000 to 350,000 inhabitants. My informant states, that, unfortunately sanitary inspectors do not exist.

The Archduchy of Hesse, with an area of over 1,800,000 acres (about the size of the West Riding of Yorkshire), and a population of about 1,000,000, is divided into 18 sanitary districts, the populations of which vary from 30,000 to about 120,000—the most populous districts being those in which large towns are situated. Each medical officer has, on an average, a population of 55,000 under his charge, and the 18 medical officers have 10 assistants who are not attached to any particular districts. The salaries of the medical officers vary from 120*l.* to 240*l.*, and of the assistants from 30*l.* to 50*l.* My informant states that the sanitary administration appears to be satisfactory, although some of the authorities show a want of interest in sanitary questions—a characteristic of which we may have a few examples in this country.

The Archduchy of Baden is divided into districts of from 10,000 to 105,000 inhabitants, each district having a medical officer, and, in the case of the large districts, an assistant medical officer. The medical

officer receives from 200*l.* to 300*l.* a year. Here the working of the system is said to be "useful, salutary, and satisfactory."

The kingdom of Wurtemberg is divided into 64 districts, with an average population of 31,000. Each district has a Medical Officer of Health, and in addition, there are seven "Medical Associates" of the Medical Board—a body, part of whose duty it is to visit the various districts periodically. Eight such visits are made every year, so that each district is visited once every eight years. The organization in this case is said to have been satisfactory since the custom of visits by the Medical Board was established.

The sanitary administration of the kingdom of Bavaria, apart from the fact that there are no lay inspectors, would seem to resemble that of this country in that it is divided into eight "Government Districts" corresponding to our counties, each having a "Medical Councillor," and into 152 "Local Districts," with an average population of 30,000, under the supervision of a District Medical Officer. In addition to these officials there is a "Chief Medical Councillor." The salaries of the District Medical Officers vary from 90*l.* to 140*l.* a year, those of the Government Medical Councillors from 245*l.* to 288*l.*, and that of the Chief Medical Councillor from 300*l.* to 350*l.*—the amounts varying in accordance with length of service. Here the organization is said to have proved satisfactory on the whole.

In addition to their salaries, Medical Officers of Health throughout Germany receive fees for public vaccination; and although they are not allowed to hold other public appointments they may undertake private practice, but, it is said, that their official duties occupy most of their time.

In France sanitary organization is at present being considered, and a Bill has been submitted to the Chamber of Deputies by a "Consultative Committee on Hygiene," which is said to provide for a complete sanitary service, founded partly on information furnished by foreign sanitary institutions. At present there are from 10 to 15 districts, and the sanitary officials, each of whom has one assistant, are the Professors of Hygiene in the Schools of Medicine at Paris, Lille, Nancy, Lyons, Bordeaux, and Montpellier. I am told that these officials have only existed since 1887, and that, so far, they have not rendered much service, their functions not being sufficiently well defined. The salaries of the head officials are 240*l.* a year in addition to that which they derive from other public appointments. Each "arrondissement" also has a recognised medical officer whose duties seem to be "to make investigations and draw up reports on epidemics."

To return to England, I think the system of lay inspection, in principle, is an admirable one, but I have said enough to indicate that reform in detail is necessary.

In the first place, it ought to be a condition of appointment that all candidates should furnish evidence, in the shape of a recognised diploma, of having acquired a knowledge of their duties. This diploma, in my opinion, ought not to be granted unless the candidate can satisfy the

examiners that he possesses a practical, in addition to a theoretical knowledge of these duties, by previously having been either a pupil or an assistant under a qualified inspector or surveyor. I have seen enough to convince me of the worthless nature of book knowledge only, when an attempt is made to put it into practice. Not only should practical knowledge be required as regards all future candidates, but every inducement should be offered those inspectors at present in office to qualify for the diploma. I am glad to say that I know of one town where this inducement is offered—in the shape of an increase of 13*l.* a year in the inspector's salary on his obtaining the diploma.

The question will no doubt arise as to what shall be recognised as the qualifying body; but this is a detail which at present need not be considered, although it may well be supposed that the claims of the Sanitary Institute of Great Britain, by reason of the excellent work it has done in this direction during the past 13 years, ought to receive due recognition.

As regards salaries, if we impose conditions that necessitate a considerable amount of time, and consequently money, being spent in acquiring the knowledge to fit men for the work, and this, too, in the face of the possibility that they may not be successful in the after competition for an inspector's post, it stands to reason that a reasonable inducement should be offered in return.

For the same reason greater security of tenure of office must be guaranteed. Without this security the inspector is practically at the mercy of a body of men, many of whom are directly interested in property which he may consider it his duty to condemn; to be firm and consistent in the discharge of his duties under these circumstances is more than can be expected of human nature. An inspector ought to retain his appointment so long as he efficiently discharges his duties; and, in order that this security may be guaranteed, his dismissal ought, in all cases, to receive the sanction of a controlling and independent body.

In rural districts it is unreasonable to expect the inspector to pay his travelling expenses out of the miserable pittance that is usually paid to him, and yet, without exception, in the districts embraced in my inquiry, this is the case. He ought not to be called upon to spend the greater portion, if not the whole, of his salary—which he must do if he does his work—in providing a conveyance to enable him to cover the ground.

The districts, too, under the supervision of one inspector, as regards area in some cases and population in others, are much larger than he can possibly undertake. This fault can be rectified by providing him with assistance; but, in other cases, the districts are too small to support a properly qualified and well paid official. This also is capable of adjustment, although at present I must not attempt to indicate by what means. I would merely throw out the suggestion that the appointment of Registrars of Births and Deaths in the smaller districts, which at present are almost exclusively held by shopkeepers and others whose occupations are in no way allied to such duties, might more reasonably be held by inspectors, under the control of medical officers, and thus

serve the purpose of amplifying their incomes from a more appropriate source than is usual at present. Moreover, the inspection of dairies and cowsheds and canal boats, which is so frequently entrusted to police officers and others quite unfitted for the duties, ought, in all cases, to be in the hands of sanitary inspectors.

In conclusion I would now simply add, by way of emphasizing what I have already said, that, having recently had many opportunities of judging of the work done by sanitary inspectors in various districts, the necessity which I had previously felt to exist for radical reform in that department of sanitary administration has been amply confirmed. The undoubted evidence of good work, in districts in which the inspector proves to be a man who takes an intelligent interest in his work and exerts himself to acquire a knowledge of his duties—and this, too, in the face of little encouragement from those in authority, for whose approval he certainly is entitled to look —testifies to the good that must necessarily follow wise reform. If the inspectors with whom I have come in contact in Staffordshire may be taken as a type of those of other counties, I believe that any effort in the direction of increasing their facilities for becoming more efficient officers will receive at their hands most cordial support. In proof of this I may mention that, as the outcome of a course of lectures, given by myself in the first instance, and of a second course, given under the auspices of the Sanitary Institute, in which I had the kind assistance of various specialists, no fewer than 26 out of 52 inspectors in the administrative county have entered for an examination with the view of obtaining the diploma of the Sanitary Institute.

I have strung together in this paper certain facts by way of illustrating the weak points of the present sanitary administration, and I have indicated the lines on which, in my opinion, reform ought to proceed. The facts can be relied upon, although the suggestions may be open to criticism. I trust that what I have said may provoke a discussion among those present which will impart a wholesome stimulus to the powers that be, and thus assist in bringing about—let us hope in the near future—a change for the better in the present order of things.

TABLE I. (URBAN).

1. Classification as to Population.	Number of District corresponding to Name in Returns.	3. Salary.	4. Whether One-half paid by County Council.	5. Appointment, Annual or Permanent.	6. Other Appointments held by Inspector.	7. Extra Salary for other Appointments.	8. Number of Inspectors in the District.	9. Length of Time in present Appointment. Years.	Months.	10. Was similar Appointment held before?	11. Occupation previous to First Appointment as Inspector.	12. Previous Special Knowledge, Training, or Experience required in Candidates.
Under 500,000 and over 400,000.	1	£ 250	Yes	P.	Food and drugs inspector*	Inclusive	One, and 24 assistants.	9	0	Assistant Inspector.	Plumber and clerk of works.	Building knowledge and certificate of Sanitary Institute.
Under 100,000 and over 50,000.	2	140	No	P.	Food and Drugs Act	,,	One, and two do.	20	0	No	Builder's foreman	In future, probably.
	3	115	No	P.	Nil*	,,	One, and assistant.	0	10	Assistant Inspector.	No return	(No return.)
	4	120	Yes	A.	Nil	,,	One	1	6	Yes	Farmer	Yes.
	5	104	No	P.	Nil	,,	Two	1	6	Assistant Inspector.	Various	Good general knowledge of duties.
Under 50,000 and over 30,000.	6	120	No	A.	Market inspector and superintendent fire brigade.†	,,	One	7	0	No	Road contractor	Nil.
	7	100	No	P.	Nil*	,,	One	0	3	Assistant Inspector.	Clerk	Previous experience pertaining to duties.
	8	110	No	P.	Nil*	,,	One	10	0	No	Boat-maker	Nil.
	9	100	Yes	A.	Nil*	,,	One	4	0	No	Mine surveyor	Nil.
	10	150	Yes	A.	Nil†	,,	One	15	0	Assistant Inspector.	Police officer	No condition; but present inspector holds Sanitary Institute certificate.

* Dairies, cowsheds and milkshops, and canal boats.

† Dairies, cowsheds, and milkshops.

TABLE II. (URBAN).

1. Classification as to Population.	2. Number of District corresponding to Name in Returns.	3. Salary.	4. Whether One-half paid by County Council.	5. Appointment, Annual or Permanent.	6. Other Appointments held by Inspector.	7. Extra Salary for other Appointments.	8. Number of Inspectors in the District.	9. Length of Time in present Appointment. Years.	9. Months.	10. Was similar Appointment held before?	11. Occupation previous to First Appointment as Inspector.	12. Previous Special Knowledge, Training, or Experience required in Candidates.
		£										
Under 30,000 and over 20,000.	11	110	No	P.	Nil*	Inclusive	One	13	0	No	Potter	Nil.
	12	100	No	P.	Market inspector	20*l.*	One	8	6	Assistant Inspector.	Gas-fittings maker	Special knowledge of sanitation.
	13	120	Yes	A.	Nil*	Inclusive	One	15	0	No	Colliery manager	Nil.
	14	100	Yes	For 5 years.	Payment of wages of scavengers.*	„	One	17	0	No	Iron worker	Nil.
	15	120	No	A.	Market inspector*	„	One	16	0	No	Clerk	Nil.
Under 20,000 and over 15,000.	16	100	No	A.	Manager of manure works†	„	One	3	0	No	No return	Nil.
	17	90	No	P.	Nil†	„	One	18	0	No	Police officer	Nil.
	18	35	No	P.	Rate collector†	60*l.*	One	1	8	No	Rate collecter	Nil.
	19‡	100	Yes	For 3 years.	Surveyor*	100*l.*	One	14	0	No	Contractor	Nil.
	20	230	No	P.	Surveyor†	Inclusive	One, and office boy.	17	0	No	Land and building surveyor.	Nil.

* Dairies, cowsheds and milkshops, and canal boats. † Dairies, cowsheds, and milkshops. ‡ Practically Urban District as regards area.

TABLE III. (URBAN).

1. Classification as to Population.	2. Number of District corresponding to Name in Returns.	3. Salary.	4. One-half County Whether paid by Council.	5. Appointment, Annual or Permanent.	6. Other Appointments held by Inspector.	7. Extra Salary for other Appointments.	8. Number of Inspectors in the District.	9. Length of Time in present Appointment. Years.	9. Months.	10. Was similar Appointment held before?	11. Occupation previous to First Appointment as Inspector.	12. Previous Special Knowledge, Training, or Experience required in Candidates.
		£										
Under 15,000 and over 10,000.	21	115	Yes	P.	Nil*	Inclusive	One	9	0	No	Builder's manager	Nil.
	22	65	Yes	A.	Nil†	„	One	5	0	No	Boat steerer	Nil.
	23	100	Yes	P.	School attendance officer†	25*l.*	One	17	0	No	Engineer's agent	Nil.
	24‡	50	Yes	A.	Nil†	Inclusive	One	5	0	(No return)	Farmer	Nil.
	25	60	No	A.	Rate collector*	10*l.*	One	0	4	No	Clerk	In last appointment, candidate selected undertook to obtain certificate of Sanitary Institute within 12 months.
	26‡	75	Yes	A.	Surveyor*	100*l.*	One	3	6	Under Borough surveyor.	Assistant Borough surveyor.	Nil.
Under 10,000 and over 5,000.	27	25	Yes	For 3 years.	Inspector of rural district; vaccination officer.	160*l.*	One	14	0	No	Police officer	Nil.
	28	100	Yes	For 2 years.	Assistant clerk and collector of rates.†	Inclusive	One	14	0	No	Clerk	Nil.
	29	60	No	P.	Surveyor and rate collector*	„	One	13	0	No	Land surveyor	Nil.
	30	50	No	P.	Collector of rates*	„	One, and assistant.	1	0	Yes	Rate collector	Nil.

* Dairies, cowsheds and milkshops, and canal boats. † Dairies, cowsheds, and milkshops. ‡ Practically Urban District as regards area.

TABLE IV. (URBAN).

1. Classification as to Population.	2. Number of District corresponding to Name in Returns.	3. Salary.	4. Whether One-half paid by County Council.	5. Appointment, Annual or Permanent.	6. Other Appointments held by Inspector.	7. Extra Salary for other Appointments.	8. Number of Inspectors in the District.	9. Length of Time in present Appointment. Years.	9. Months.	10. Was similar Appointment held before?	11. Occupation previous to First Appointment as Inspector.	12. Previous Special Knowledge, Training, or Experience required in Candidates.
Under 10,000 and over 5,000—*cont.*	31	£ 35	Yes	For 3 years.	Nil*	Inclusive	One	5	0	Yes; previously in same district.	-	Nil.
	32	37	Yes	A.	Surveyor and rural inspector, and at liberty to undertake other work.*	137*l.* 10*s.*	One	13	0	Yes	Borough surveyor's assistant.	Nil.
	33†	35	Yes	A.	Surveyor and collector of rates.*	55*l.*	One	6	0	Yes	Surveyor and collector.	General knowledge of Public Health Act.
	34	78	No	P.	Surveyor and clerk of works of sewage scheme.*	52*l.*	One, and assistant.	0	2	No	Borough surveyor's pupil.	Ordinary amount of knowledge and experience.
	35	80	Yes	A.	Surveyor of urban and rural districts and engineer of waterworks.	285*l.*	-	0	8	Yes	Civil engineer and surveyor.	Nil.
Under 5,000 and over 2,000.	36	78	No	P.	Road surveyor and rate collector.	Inclusive	One	23	0	No	Factory manager	Nil.
	37	33	Yes	A.	Surveyor‡	50*l.*	One	0	9	No	Clerk	Nil.
	38	35	Yes	For 3 years.	Collector of rates‡	25*l.*	One	3	0	No	Accountant	Nil.
	39	35	No	P.	Surveyor and rate collector‡	Inclusive	One	4	0	No	Butcher	Nil.

* Dairies, cowsheds, and milkshops. † Practically urban district as regards area. ‡ Dairies, cowsheds and milkshops, and canal boats.

TABLE V. (RURAL).

1. Classification as to Area.	2. Number of District corresponding to Name in Returns.	3. Salary.	4. Whether one-half paid by County Council.	5. Appointment, Annual or Permanent.	6. Other Appointments held by Inspector.	7. Extra Salary for other Appointments.	8. Number of Inspectors in District.	9. Length of Time in present Appointment. Years.	9. Months.	10. Was similar Appointment held before?	11. Occupation previous to First Appointment as Inspector.	12. Previous Special Knowledge, Training, or Experience required in Candidates.
Under 90,000 and over 80,000.	1	£ 215	Yes	A.	No reply* - - - -	Inclusive	One	8	0	Borough surveyor for 16½ years, and inspector for 3½ years.	Land surveyor -	Competent to make plans, &c., sewage works, and sanitary engineering.
Under 70,000 and over 60,000.	2	135	Yes	For 3 years.	Vaccination officer and inspector of urban district.†	50*l.*	One	14	0	No	Police officer -	Nil.
	3	100	Yes	A.	Nil - - - -	Inclusive	One	18	0	Yes	Relieving officer, and registrar of births and deaths.	Nil.
	4	84	Yes	A.	Nil* - - - -	"	One	3	0	Yes	Builder - -	Nil.
	5	100	Yes	A.	Surveyor and inspector of urban and rural districts, and can do other work.‡	74*l.* 10*s.*	One	5	0	No	Assistant to a borough surveyor.	Nil.
	6	75	Yes	A.	School attendance officer and vaccination officer.‡	47*l.*	One	3	6	No	Clerk - -	Nil.
Under 60,000 and Over 50,000.	7	160	Yes	A.	Collector of rates and taxes‡ -	Inclusive	One	17	0	No	Farmer - -	Nil.
	8	77	Yes	A	Surveyor and various‡ -	"	One	12	0	No	Builder's foreman	Nil.
	9	65	Yes	A.	Vaccination officer, school attendance, and inquiry officer.‡	70*l.*	One	10	0	No	Coal merchant -	Nil.

* Dairies, cowsheds, and milkshops. † Canal boats only. ‡ Dairies, cowsheds, milkshops, and canal boats.

1. Counties as to Area.	2. Number of District corresponding to Name in Returns.	3. Salary.	4. Whether One-half paid by County Council.	5. Appointment, Annual or Permanent.	6. Other Appointments held by Inspector.	7. Extra Salary for other Appointments.	8. Number of Inspectors in District.	9. Length of Time in present Appointment. Years.	9. Months.	10. Was similar Appointment held before?	11. Occupation previous to First Appointment as Inspector.	12. Previous Special Knowledge, Training, or Experience required in Candidates.
		£										
Under 50,000 and over 40,000.	10	120	Yes	A.	Surveyor of urban and rural district, engineer, and manager of waterworks.*	245*l.*	One, and assistant.	11	0	Yes	Civil engineer and surveyor.	Yes.
	11	135	Yes	For 5 years.	School attendance officer† -	40*l.*	One	18	0	No	Sergeant instructor to volunteers.	Nil.
Under 40,000 and over 30,000.	12	90	Yes	A.	School attendance officer†	25*l.*	One	6	0	No	Police officer and school attendance officer.	Nil.
18,000	13	80	Yes	A.	Nil, allowed to practice as architect.*	Inclusive	One, and assistant.	8	0	No	Architect and surveyor.	Nil.
10,000	14	185	Yes	P.	Nil† - - - - -	„	One	19	0	No	Builder's foreman	Nil.
	15	62	Yes	A.	House and estate agent* -	„	One	15	0	No	Clerk, rent collector, house agent, &c.	Nil.
	16	70	Yes	A.	Surveyor of buildings* - -	10*l.*	One	0	3	Yes	Carpenter and	Yes, but not specified

The Education, Position, and Duties of Plumbers.

BY

Professor GARNETT, Principal of the Durham College of Science; and Dr. VACHER, Medical Officer of Health, Birkenhead.

Read by the Master of the Worshipful Company of Plumbers,

MR. W. H. BISHOP.

THE EDUCATION OF THE PLUMBER.—In common with other lads of the artisan class, those who enter the plumbers' craft generally leave school at a very early age, and by the time they are old enough to value the instruction they have received they have forgotten most of what they were taught. Hence not infrequently the teacher of plumbing has first to take his class through a short course of workshop arithmetic. A little practice in freehand drawing, particularly in making dimensioned sketches of apparatus connected with the plumber's craft, is very desirable; while it is of still greater importance that the apprentice should be taught how to "read" a working drawing with the meaning of plan, elevation, section, &c. Having mastered these elementary principles, he proceeds to practical applications of his knowledge. He should be taught to mark off the lining for an oblong sink with sloping sides. The elements of mechanics, including strength of materials, of hydrostatics and hydraulics in their application to water seals, the flow of water in pipes, and other every-day problems, the effects of heat and cold on water and on lead, the chemistry of air, water, lead, zinc, iron, and copper, and the action of fluxes in soldering, the nature of combustion and respiration, the principles of ventilation, and the character and mode of propagation of zymotic diseases, are all items of scientific knowledge which the plumber cannot afford to neglect. The science subjects required by the plumber's apprentice may therefore be enumerated as mathematics, practical geometry, machine drawing, theoretical mechanics, applied mechanics, inorganic chemistry, heat, and hygiene, and to these may with advantage be added electricity and freehand drawing; and when he has mastered all these there remain the applications of the scientific principles to the practical details of his craft.

Attempts to teach plumbers side by side with apprentices belonging to other trades in ordinary science classes have not met with encouraging results. The only satisfactory method consists in teaching the plumbers most of what they require to know in a class by themselves, illustrating every scientific principle by examples derived from the plumbers' every-day work, and to the majority of the apprentices giving instructions only in those parts of a science which are immediately applicable to the practice of their craft.

There is no reason why a lad's powers of observation and of reasoning should not be called into play as well by the study of special branches of half-a-dozen sciences as by his more thorough devotion to

all the branches of one or two. Of course it would be more satisfactory if all the sciences touched upon could be mastered systematically and thoroughly, but an apprentice's life is short, and when from that life there are deducted between 50 and 60 hours a week for the workshop, the hours available for study are very few. Only the winter evenings are available for class work, and it therefore becomes necessary to extend the course of instruction throughout the whole term of apprenticeship. On so long a road it is necessary that some milestones should be placed to encourage the traveller and mark his progress. To this end the Worshipful Company of Plumbers has drawn up a graded syllabus of instruction corresponding to preliminary, intermediate, and final courses, and has arranged to conduct an examination at the end of each course, and to give a certificate to all who satisfy the examiners. There will thus be three grades of certificates for journeymen and apprentices, and those who satisfy the examiners in certain additional subjects in the final examination become eligible for a masters' certificate, making four grades of certificates in all. At the end of his first or second year of apprenticeship the young plumber should obtain the preliminary certificate. This marks a certain standard of efficiency, and he will not again have to pass an examination in the more elementary subjects of the preliminary course. Such a certificate should have a commercial value as indicating on the part of the holder both capacity and industry. A year after taking the preliminary certificate the intermediate examination should be passed, and the second certificate obtained. At the end of his apprenticeship the young improver should be able to pass the final examination on the result of which the certificate of registration is given with the title of registered plumber, and in certain cases of honour men, the Freedom of the Plumbers' Guild of the City of London is granted in addition. The graded syllabus of instruction and the examination questions set last May for the *preliminary* certificate are appended to this paper.

The next question is the character of the teacher, and it may be assumed that it is very undesirable to employ a large number of teachers for one class of students. A practical plumber holding a high position in the estimation of the local trade, and possessing thoroughly scientific knowledge and the power of imparting it, is far the best teacher; and where such a man can be found his services should, if possible, be secured at any cost and utilised to the utmost in the conduct of as many classes as possible in the more important towns of the district. Unfortunately, men possessing these qualifications are very difficult to find, and still more difficult to secure for educational purposes, and when they are not available the best substitute is an experienced teacher of considerable scientific attainments, who has had some experience of workshop life, who understands the habits and modes of thought of artisans, and who will take the trouble to learn the nature of the work which the plumber has to carry out, and the conditions which determine its efficiency. A teacher who has so far mastered mathematics and mechanics as to be able to put the most advanced conclusions in the simplest form, who has a sound knowledge of physics and chemistry, and who has had some

training in an engine works or in any other mechanical trade may, by the careful study of such works as those of P. J. Davies, J. W. Clarke, S. S. Hellyer, W. P. Buchan, W. R. Maguire, and others, and by keeping his eyes about him, readily fit himself to teach all that is required except workshop practice. This last must, of course, be dealt with by a practical plumber, and it is very desirable that the whole course of instruction should be under the general direction of a committee of plumbers. If within the next few years classes for plumbers are to be conducted at all commensurately with the requirements of the country, the provision of normal classes for teachers in two or three important centres where special facilities exist should at once engage the attention of local authorities.

It may be asked whether the methods here advocated should be followed in providing technical instruction for those engaged in all other mechanical industries. In reply it may be stated that it is both unnecessary and impossible to provide such instruction for all the rank and file of most trades. The plumber's position is *exceptional* on account of (1) the great degree of *individual* responsibility resting on *the ordinary journeymen*—(2) the enormous public interest involved.

The greater part of the skilled labour of this country is performed in factories, engine works, shipyards, and similar establishments, under the direct supervision of a foreman, overman, shop manager, or other responsible person. All that is required of the workman is manual dexterity, and this is not to be gained in the technical class. Generally there is little room for thought or originality. All the thinking has to be done by the few who are responsible for design or management, and unfortunately, it is sometimes believed to be to the interest of the employer even to discourage thought on the part of the workman. In such cases there is still room for technical instruction in order that the workman may take an intelligent interest in his work, and that the few of exceptional ability and ambition may qualify themselves to occupy positions of responsibility later on. It may fairly be debated whether in many trades the ordinary journeyman would not do better by devoting his leisure hours to the study of literature or fine art than by employing them in the acquisition of the scientific principles and technology of his craft. Of course much of the plumber's work, like the engineer's, is done in the shops, under the eye of the foreman, but in his most important work the sanitary plumber is generally his own foreman. Accompanied by an assistant, the plumber enters the dwelling-house, and henceforth the health, and perhaps the lives of the household, are in his hands. Efficient inspection *after* the work is done is practically impossible. The journeyman plumber makes his own diagnosis, applies his own remedies, without even nature to help him, and finally conceals his work so that the efficiency of his treatment can only be tested by time.

In these circumstances it is obviously a necessary safeguard to the public that they should be provided with means of distinguishing who have been properly educated and have given proof of their knowledge and practical skill.

The conduct of technical classes under the direction of committees composed chiefly of members of the plumber's craft, the publication of a graded syllabus of instruction covering the whole ground required by the apprentices, and including all the branches of science which bear upon the craft, the granting of a series of certificates on the results of examinations with the final certificate of registration regarded as proof both of practical skill and scientific attainments, while essentially pioneer work, mark the greatest advance which technical instruction has yet made in this country.

The position of the Plumber.—Every calling which intimately concerns the health of the community should be under statutory enactments regulating the qualifications and practice of its members. Thus, a doctor must furnish proof of a long course of study, and of the possession of the necessary skill and knowledge and attainments before becoming a registered medical practitioner. So must the dentist and the pharmaceutical chemist before they receive their respective diplomas.

The plumber, who is at least as intimately associated with the health of the public and the individual as those following any other vocation, is in the unique position of being under no statutory regulation or observation. Apart from the course of instruction formulated by the Worshipful Company of Plumbers, there is no curriculum of study arranged for the plumber, no prescribed term of work at the bench, no compulsory examination in theory and practice to be passed. There are no rules to which he must conform, no wholesome disciplinary powers of which he stands in fear.

While there is no prescribed training for the plumber, no test examination all must pass, it follows that the genuine plumber must compete in the same market with the untrained and untrustworthy. Men who have never served an apprenticeship or undergone any technical training, offer to do plumbers' work and obtain employment at labourer's wages, to the manifest injury of the public and the plumber. What the genuine plumber who has spent much time and money in qualifying himself wants is some certificate or voucher giving him a recognised position, and distinguishing him from the unqualified man. What the public desire is similar, a distinctive mark telling of fitness of training, by which they will know on the best authority the masters and men who are really plumbers and may be trusted to do efficient, honest work.

The very serious extent and the continual spread of the insanitary evils associated with defective plumbing and drainage work have in recent years so far engaged public attention that the great body of the medical profession, and the sanitary authorities of the United Kingdom, have declared it to be essential to the protection and preservation of the health of the community that plumbers should be efficiently trained and educated, and should pass qualifying examinations as to their knowledge and practical skill before engaging in those branches of plumbers' work which effect the sanitary condition of dwelling-houses and other

buildings. Sir Charles Cameron, M.D., Medical Officer of health for Dublin, well expresses the opinion of the medical profession and of expert sanitarians on this topic. "It is now desirable," he says, "that "persons who profess to be plumbers should be tested as to their "competency to do the work of a plumber. The sanitary state of a "house largely depends upon the provision made for the getting rid "of waste water produced in it, and if the water-closets and sewers "employed to get rid of those matters are constructed by mere handy "men, labourers, &c., they are likely to be defective and injurious, "rather than beneficial to health."

As regards the importance of the position of the plumber, the weighty words of Professor Armstrong (of Edinburgh University) are well calculated to arrest attention. He said:—"No one who had the "slightest acquaintance with the history of sanitary science, or with "the nature and extent of the incidence of disease, could for one moment "entertain a doubt as to the supreme importance of the position which "sound and intelligent plumbing occupied in relation to the health of "every household; for, according as the plumbing in a house was good "or bad, thoughtfully or carelessly done, so was it calculated to make or "mar the health of those who dwelt in it. With such heavy responsi-"bility, and with such enormous interests at stake, it was surely not "unreasonable to demand that plumbers who were entrusted with work "of this kind should be just as carefully and systematically registered as "medical men and lawyers were required to be." It would be easy to multiply quotations from skilled workers and writers in this connexion, but there is no need to do so. When it was thought that public opinion was sufficiently advanced to support the action of the medical profession and the leaders in the plumbers' craft, the chief sanitary authorities and others united with the Worshipful Company of Plumbers in establishing a system of training and registration in Great Britain and Ireland. After some preliminary meetings in the autumn of 1884 and in 1885, this system was commenced, and the register for duly qualified plumbers was opened in March 1886. Since that date the registration movement has been making steady progress, and it well deserves the hearty support of the community at large. In this matter public opinion has been supported throughout the United Kingdom by the members of the craft. The plumbers themselves are anxious to raise their craft into the position which it ought to occupy in the estimation of the world, and they well know that this can be effected only by the weeding out of ignorance and dishonesty. The formation of district councils for the registration of plumbers in the most important divisions of the country indicates the feeling of the members of the craft with respect to this question. Most of the district councils comprise besides masters and operative plumbers, members of local health committees, medical officers of health, leading physicians, and architects, and other representative persons. The co-operation of local sanitary authorities is of the utmost importance in the development of any system of registration, and the registration committees may in many ways render valuable aid to the local authorities. As stated by Dr. Alfred Hill, the medical officer

of health for Birmingham, "the health committees want really to make "plumbers their technical assistants." Opportunities are afforded to men of proving their knowledge and skill before competent examiners. The certificate they receive, if successful in passing the examinations, gives them a recognised standing and position not before attainable. It is important to add that a certificate thus obtained may be withdrawn from anyone who shall be convicted of doing work dangerous to health, or distinctly in contravention of what has been undertaken.

Appendix A.

Grand Syllabus of Instruction for Plumbers.

Preliminary Course.

To occupy One Year or Two Years according to the previous Education of the Apprentice.

Workshop Arithmetic.—Duodecimals. Square Root. Mensuration of the circle, square, cylinder, cone, prism, pyramid, &c. Density of materials. Calculation of the weight of simple solids and figures made of sheet metal.

Geometry and Drawing.—Simple problems on the straight line, circle, triangle, and other plane figures; developable surfaces, with special reference to the cutting out of sheet lead, for the formation of elbows or knees in circular or rectangular seamed pipe, of conical trumpet mouths, and of covering for various architectural designs (all the figures may be made of paper in the class room). Elements of descriptive geometry. Meaning of plan, elevation, section, &c. Reading working drawings. (*Note.*—It is not necessary to spend time in highly finished drawings; the main object is to teach apprentices to "read" a drawing placed before them). Making rough dimensioned sketches of apparatus and plumbers' work.

Mechanics, Hydrostatics, &c. — Workshop appliances, such as the lever, pulley, blocks, &c. Simple applications of the principle of energy. Fluid pressure—"Head of water." Specific gravity—The Hydrometer. Barometer. Siphons and water gauges. Nature of a "water seal."

Heat.—The effects of heat on solids. The thermometer. Expansion and contraction of solids and liquids. Effects of hot and cold water on lead pipes. Expansion of water in freezing. Bursting of pipes, &c.

Chemistry.—Elementary chemical principles. Air, water and combustion. Chemical properties of lead, iron, zinc, and tin.

General Plumbing.—The equipment of the workshop. Plumbers' tools. Manufacture of cast sheet lead, moulded lead, seamed pipes, seamless pipes, &c. Marking off simple work in sheet lead.

Workshop Practice.—Marking off and cutting out sheet lead. Simple examples of lead bossing. Bending pipes up to 2-in. in diameter.

N.B.—The treatment of general plumbing in the lecture course is not intended to take the place of workshop instruction, but to supplement it. Difficult questions can be more fully explained in the lecture room than in the workshop, and should be treated as illustrations of the physical

laws and principles involved, so that the subject of general plumbing as treated in the lectures should be taught by means of illustrations distributed over all the other subjects, thus giving life and interest to the whole teaching.

INTERMEDIATE COURSE.

Geometry and Machine Drawing.—The applications of geometry to sheet lead work of a more advanced character than in the first year. Making descriptive drawings from actual pieces of apparatus.

Freehold Drawing.—Making dimensioned sketches of a more difficult character than in the first year.

Strength of Materials.—Elasticity. Imperfect elasticity of lead, and precautions necessary in consequence. Elastic limits. Safe load. Ultimate strength. Strength of pipes and boilers to resist bursting pressure. Flow of solids. Behaviour of lead under great pressure. Lead bossing. Manufacture of seamless pipes, bends, &c. Shearing and bending. Results obtained by the testing machine.

Heat, &c.—Expansion of gases. Gaseous laws. Conduction, convection, radiation, and absorption. Radiators for heating purposes. General principles of hot water circulation and ventilation. Effects of heat on the strength and elastic properties of lead and alloys. Heat as a quantity. Amount of heat necessary to warm the air of a building. Heating by hot water and steam. Specific and latent heat. Melting, evaporation, and boiling.

Chemistry.—Water, and its impurities. Chemical properties of copper, brass, gun-metal, &c. Action of water on lead and other metals. Metallic oxides. Effects of air, carbonic anhydride, acids, &c., on the chief metals used by plumbers. Litharge, red lead, white lead, &c. Fermentation, "sewer gas." Influence of "sewer gas" on lead. Solders; their preparation, fusing points, methods of purification, &c. Fluxes: their action. Brazing. Autogenous soldering. Rust joints.

Electricity.—Knowledge of the elements of electricity so far as may be needed to prevent electrolysis due to the association of different metals; for the fixing of bells, and for dealing intelligently with electric light conductors and fittings.

General Plumbing.—First year's course continued. Manufacture of various forms of traps and other appliances. Jointing and bending of pipes. Roof work and lead work generally.

Workshop Practice.—Bending pipes from 2 in. to 4 in. in diameter. Jointing lead pipes. Making seamed pipes. Soldering by various systems.

FINAL COURSE.

Hydraulics, &c.—Relation between "head" and velocity of efflux. Effect of form of orifice on velocity of efflux. "Trumpet-mouth wastes." Resistance of pipes for water and gas. Size of pipes for given delivery with given "head." Resistance of bends, elbows, &c. "Siphonage" and "waving out" of traps. Position of air pipes to prevent siphonage. Different forms of traps and their relative advantages. Ventilation of drains, soil-pipes, &c. Action of cowls. *Hydraulic transmission of power. Water supply of houses. *Water supply of towns. Design of flushing tanks and connexions. Pumps. *Hydraulic rams for water supply.

Heat.—Principles of hot-water circulation. *Details of systems for heating by hot water and steam. *Calculation of dimensions of pipes required. *Details of systems of ventilation. Relation between temperature and pressure of steam. *Heating by hot water at high pressure.

Building Construction.—The elements of building construction with special reference to roofs, and the mode of rendering them water tight. Lead flats, gutters, flashings, soakers, &c.

Sanitation.—Arrangements necessary to prevent the contamination of water. Filters. *Fermentation and sewer gas. *Relation between ferments and zymotic diseases. General arrangement of plumbers' work in a dwelling-house, including water-supply, sinks, closets, lavatories, hot-water apparatus, ventilation of house drains, connexion with sewer, &c. *Sanitation of public buildings. *Systems for the disposal of sewage. The laying of drains—size, fall, material, &c. Iron drains. Trenches for drains. Peculiarities of different strata met with in underground work. Testing drains and fittings.

General Plumbing.—House cisterns, their construction, arrangement, and fittings. Service boxes, water-waste preventers, &c. Coating pipes internally. Construction of joints, bends, elbows, fittings, &c., with special reference to the laws of hydro-dynamics. The taking out, reading, and measuring up of plumbers' quantities, specifications, and work. Hot water for domestic purposes. Dimensions of fittings to secure the best effects. Domestic plumbing generally.

Workshop Practice.—Jointing pipes (more difficult examples than those given in the Intermediate Course). Manufacture of traps. Architectural work. Lead burning.

Note.—In carrying out this course of instruction, it is very desirable that arrangements should be made to alternate the more abstract subjects (say arithmetic, geometry, &c.) with those bearing more directly on the every-day work of the plumber, in order to render the course of study as interesting as possible. This refers particularly to the Preliminary and Intermediate Courses.

Appendix B.

THE WORSHIPFUL COMPANY OF PLUMBERS.

Preliminary Examination.

To obtain the Preliminary Certificate, candidates must show a fair general knowledge of the subjects referred to in the following questions. To obtain a prize, special excellence must be shown in one of the sections, A, B, C, or D. Candidates are recommended to attempt at least one question in each section, and all the questions in one section:—

A.

1. How would you find the width of a strip of lead which would make a 4½-inch circular seamed pipe? 2. What weight of 7-lb. lead would be required to cover a cone 6 feet in diameter at the base, and 10 feet high? 3. A cistern measures 4 feet by 2 feet 6 inches, by 2 feet. How many gallons of water will it hold, and what weight of 6-lb. lead will be required to line it? 4. A conical "trumpet mouth" is to be made in sheet lead. It is 4½ inches wide at the top and 1½ inches at the bottom, and is 16 inches long. Show how to cut out the lead so that when bent it may form the "trumpet mouth."

---

*Candidates for certificates as masters will be expected to be acquainted with the subjects marked * in the Final Course; and only those who satisfactorily answer the questions in these subjects will be eligible for Honours.

B.

5. Give a short description of a plumber's "kit," with sketches of the tools. 6. Make a dimensioned sketch of a simple wash-down basin, showing the arrangement for flushing, and the amount of "water seal" in the trap. 7. What is meant by "head of water"? A cubic foot of water contains 62½ lbs.; what head is equivalent to 80 lbs. per square inch?

C.

8. What is the effect of frequent changes of temperature on lead, nailed or otherwise secured between two points? How would you support a half-S trap under a "hopper," a "receiver," or a "container"? 9. What is the cause of lead pipes bursting during frost? What precautions should be taken to prevent the bursting of water pipes in a private house?

D.

10. How would you prepare a quantity of plumber's solder? How would you remove zinc from old solder? How does plumber's metal differ from "fine solder"? 11. Why are fluxes used in soldering, and how do they act? What is the danger of using acids or salts as fluxes? 12. What use is made of white lead in plumbing work? 13. What is the action of rain or "soft" water upon lead?

Report of the Council of the Association of Sanitary Inspectors of Great Britain to the Seventh International Congress of Hygiene and Demography.

Communicated by

The Chairman of the Council of the Association,
Mr. Hugh Alexander.

The Council of the Association of Sanitary Inspectors of Great Britain have thought that it would interest the members of the International Congress of Hygiene to hear a short report relating to the duties of sanitary inspectors and the conditions under which those duties are discharged, and how far they are useful for public service in a sanitary point of view.

To the foreign visitors and members of the Congress, the subject may, we think, be of some special interest, because the service we represent is singularly illustrative of the methods of progress peculiar to the English people.

Our organisation is, comparatively, a new departure from a system almost as ancient as our constitution itself. Since the days of Queen Elizabeth there has always existed in every distinct centre, in every village even, an officer who might be considered a sanitary inspector, inasmuch as he possessed the power to remove any extreme nuisance that was injurious to the health of the community. This officer was the overseer of the highways; it was an elective office annually made by the local ruling authority or vestry, and it devolved

on some responsible and respectable inhabitant, as did other offices, such as overseer of the poor, and even parish constable. In emergency these offices, in combination with others constituting the vestry, had the power also to appoint, temporarily, persons of various degree and influence to inspect and otherwise assist in the abatement of a nuisance, and of the causes leading to it. The authority could send out inspectors to view and report to them; they could draft persons from the parish workhouse or other places to form a cordon around infected localities; and, under some circumstances, they could remove the infectious sick to the pest-house or infirmary. This was a loose method of meeting the great visitations of disease, but it suited the apathy of the freedom expressed in the saying, "an Englishman's house is his castle"; and this spirit of freedom so determinedly remains, that in the legislation of the present day it is practically again set forth almost in its primitive and somewhat retrograde form. By an Act of the year 1855, the first important changes in sanitary legislation in England were introduced. The Act was the result of long agitation and almost endless compromises. It ought to have been made some years before, when the new Poor Law came into existence; and many far-seeing men, including, first and foremost, our late distinguished President, Sir Edwin Chadwick, were most earnest to make sanitary legislation for grievous sanitary evils uniform with the great social legislation affecting the poor. But in our usual one-thing-at-a-time and gradational fashion, the Sanitary Act remained until the date named, 1855.

Amongst other important modifications of law, brought in by the Act of 1855, was that of medical supervision of the public health. A large and organised staff of medical officers of health was instituted. These officers were to be elected by the local authority, and were to be at the mercy of that authority in every case. It was in vain that the more advanced reformers declared that the medical staff, in order to be able to perform its great duties with full and complete effect, must be left with proper independence of action. They were shorn of all power, except that of report to their authority.

Origin of the present System of Inspection.

The office of sanitary inspector, so-called in the first instance, came into existence practically as the adjunct, so to speak, of the medical officer. The selection of the sanitary inspector was made by the vestry or local authority. In early days it sometimes happened that the medical officer of health "found" the inspector for the vestry, and his own recommendation or influence secured the election. In time, as the office increased in importance and as the duties were discovered to clash sometimes with local and personal interests, the election became more stringent, and now there may be as sharp a contest for the post of inspector as for any other post that falls under the vote of the elective authority.

The first Selections of Inspectors.

From the circumstances under which the new body of inspectors originated on the Act of 1885, it followed naturally that there was at

first no union or bond between them. They were selected from various classes of the working community without any special idea of fitness for the office, save and except respectability, good character, and in some cases—especially in populous parts of great cities—a knowledge of the district in which it was their mission to labour. The office itself was not enticing to men who felt they could do better. It was always underpaid; it was always held at the pleasure of the authority, with risk of immediate dismissal; it was unthankful, since there were over it really three masters, the local board, the medical officer of health, and the public that had to be served; and, as may be expected, it was not at its best a pleasant office, since it caused those who followed it to have to enter and inspect the worst dens of disease of the infectious kind, to report on their condition, to superintend the removal of nuisances, and to disinfect infected rooms and clothing.

The men selected for office were, consequently, a peculiar people; men who had nothing better to do, and men, like policemen and soldiers, who had filled their terms in the services, and had learned to become accustomed to duties in which there was some personal risk. We do not feel in any sense ashamed of such a beginning; on the contrary, we are proud that a good, courageous, and honest body of men of this sort was found for it. We only name the fact to indicate the history of our organisation and the changes which have taken place, leading, as we venture to think, to other changes which ought to be made in our status and position.

For many years we remained in the condition described, fulfilling an irksome and almost impossible responsibility without a spark of independence; performing important labours, at the best with slowness and anxiety; and facing, daily and hourly, contending interests. The result has been that we have constantly been blamed for interference, and accused of apathy or idleness. For example, in the report of the Royal Commission on the Housing of the Working Classes, it was said that much evidence was given from various parts of London which proved both the absence of adequate inspection and of sufficient activity on the part of the inspectors. The "perfunctory" work of the inspectors was commented on, and it was argued that, according to the custom of certain portions of the Metropolis, it really did not matter whether the staff of inspectors were large or small. The same Commission insisted that trained men should alone be employed for inspectorship, and that the authorities should in all cases "select persons acquainted with the "principles of sanitation and of building construction."

The opinion thus expressed by the Commission is that which we ourselves had arrived at long before. Our work, in fact, became by a process of evolution less of a menial service, and more of a true and life-saving science—a very simple science in itself, no doubt, and very common-place, but still useful, and something more than a mere servitude to those who carried it out.

To be very plain, as we worked we began to learn. We picked up information from all quarters; from the medical officers of health we

gathered large sums of information in the details of scientific sanitation; their directions became our lessons, and they our learned professors. Out in our daily work we got an insight, which no other officers ever before got, of the habits of the people and of the conditions of their homes and sanitary wants. We saw the defects under which the people laboured and still labour; we ascertained what, to use a common but descriptive expression, they would and would not "stand" in the way of sanitary reform; and we gauged so precisely what could and what could not be done by law to remove dangers to health, that now and then a lawyer himself does not think it beneath him to take a hint from us as to what he can successfully condemn or defend in matters relating to nuisances and their abatement.

Under such progressive influences as these, we began, about nine years ago, to organise amongst ourselves; and in time we formed the Association of Sanitary Inspectors of Great Britain, which now numbers several hundreds out of the 2,000 of our class in this kingdom.

We were fortunate at once in securing the late Sir Edwin Chadwick as our President. He was a man removed from all party influences, and under the encouragement he gave us, and under the influence of his simple and at the same time comprehensive ideas of true sanitation, we advanced rapidly towards better organisation and system, so that we are passing at this moment from an irregular and accidental multitude into something like a professional body, with fixed views and common aspirations for a more useful, intelligent, and independent future. We have found in these aspirations one most hopeful sign. We are becoming remarkably in touch with the public, far more so than we originally anticipated. Our general meetings are well attended, well supported, and favourably noticed by the great organs of public opinion; and there is a living sympathy with us in all classes of society, from the highest to the humblest, arising, as we think, from the facts that the public opinion on sanitation is improving, and that we are recognised as the active instruments by which the sanitary measures that have to be adopted are worked out. We come into contact daily with people in their homes and speak with them on matters of practical sanitation more than any other persons in the army of sanitary reformers. We also often meet together amongst ourselves to discuss, in our own way, the most practicable and useful methods for carrying out our work; we read and discuss papers; and, whenever we can, we obtain lectures and papers from gentlemen who belong to other departments of sanitation, and who have greater scientific knowledge than we claim to possess.

In the preceding passages we have noticed the origin and intention of our Association. We now proceed to describe the wishes and hopes we entertain for the future of those who are to be participators in our work. It will be gathered already that we are no longer the accidental and untrained collection that we once were; but that we are so far advanced in years as to have commenced to entertain and form ideas of our own. These ideas we would desire respectfully to place under three heads.

(*a.*) *Education of the Sanitary Inspector.*

We think the time has come when no person should be competent for election to the position of sanitary inspector until he has shown a fair elementary educational standard. He should, we think, not only be thoroughly master of what in England is called the three R's (reading, writing, and arithmetic), but he should have an elementary knowledge of chemistry, so as to understand the action as well as the practical application of the different gases and liquids which are used for disinfection and purification; of physical science, sufficient to give him an intelligent appreciation of all mechanical methods of sanitation; of architectural construction, enough to show to him what is necessary for health in the dwelling-house and in public buildings; and, lastly, of those general rules of sanitary science and sanitary legislation as shall fit him to perform all that he has to undertake with that soundness of judgment and knowledge which alone gives confidence to the inspector himself, and to those for whom he is engaged. These would be advantages which the past race of inspectors has much felt the need of; and the remembrance of their need makes us more anxious to render the path of work and duty easier and better for those who are to follow in the same walk of life.

Our council thinks that a school or college devoted to education in the departments specified is urgently demanded, and we are considering at this moment how the project can be brought most readily and effectively into action.

(*b.*) *Qualification of Sanitary Inspectors.*

In addition to systematic education, we feel that a system of examination for competency for the discharge of the duties of Inspector is now demanded, and that before any candidate for office is permitted to compete for a post, he ought to produce a qualifying certificate or diploma. The council would prefer that the Government, through one of its departments, say the Local Government Board, should appoint an examining board for this duty, and for granting a diploma to successful competitors. They also think that after obtaining the ordinary qualification, the inspector should find his primary qualification a stepping-stone for advancement to a more stringent competition, leading to qualification for higher duties, such as that of sanitary surveyor, who might take the general supervision of inspectorship over large districts, and give uniformity to sanitary inspection over all the kingdom.

(*c.*) *Tenure of Office, and Protection in Performance of Duties.*

As will be observed already, the sanitary inspector has no protection in the performance of his official duties. He has no tenure of office beyond what the local authority pleases to give him; and he may be discharged at any time for doing an act of the most important usefulness. This takes from him independence and heart for his work, and often subjects him to the most serious misapprehensions. The public has no conception of his position in this respect. On this subject our present President, Dr. Benjamin Ward Richardson, wrote a short letter in reply

to a question addressed to him by a public man who wished to be informed on the claims of the inspectors for the protection we seek. The President said—

"No class of public officers require protection in the performance of their duties more than the sanitary inspectors. The suggestion of a sanitary defect or of a sanitary improvement, even by sanitarians so independent as myself, is constantly a cause of annoyance and serious misunderstanding. How much more, therefore, must the inspector—who is the active instrument for doing what others, who rarely appear and who in their collective capacity do not individually exist, direct to be done—have to contend with. I have heard one of them abused as if he were committing a great wrong or performing a piece of wanton mischief, at a time when the duty he was carrying out was of vital importance to health and life. Moreover, the urgency of the services of the inspector is made no excuse for their most timely activity. In the work of sanitation, promptness of action is often the direct principle of success. I remember in my early professional life being called to visit a youth who had been brought into a provincial town suffering from some obscure disease. I discovered that it was small-pox, and after attending to the man, my next care was to secure his isolation, because if that could have been done an epidemic could have been stopped at once. It could not be done, and the result was that, in a few weeks, an outbreak of small-pox was rampant, and many persons died from it. The sanitary inspector even of to-day has constantly to stand and watch in crises equally serious. As one of the police of sanitation, he is first on the scene of danger; but he dare not, on his own instance, interfere, although he may know perfectly well what, at the moment, is the very best thing to do. Imagine a policeman similarly crippled in the performance of his duties. Imagine a policeman seeing a burglar entering a house by the window, obliged to let the robber do his work that he may first report to his office that the burglary is in progress, and get instructions as to what course he ought to pursue in order to stop the robbery and suppress the thief. Or imagine a fireman called to a fire having to go to his office to report the fact and wait for orders before he dare turn on the water. It is preposterous. The sanitary inspector, on discovering a dangerous nuisance ought to be able to remove it instantly on his own responsibility. The common law will punish him fast enough if he should go wrong."

We ask for fixed tenure of office, and that we shall only be dismissible for misconduct or proved incompetency, with right to appeal to the Local Government Board; and we fail to see how that act of justice can be long denied to us. We also claim as a part of our duty that we shall periodically inspect, and have the power to deal promptly with all serious dangers to the public health on our own responsibility, subject to the confirmation of the local authority.

We think there is something in a name, and we know that for an office, as for a man, it is always injurious to be recognised by more names than one. We are sometimes designated by the title of sanitary

inspectors, which was indeed the title first assigned to us, in 1855. Since then we have been designated inspectors of nuisances. We prefer the original title as being more expressive of our duties and less objectionable to our official reputation.

We might add one more clause. We might urge with fairness that for our exclusive work salaries at a minimum of 25*l.* and a maximum of 300*l.* a year might be revised in our favour. But this is a topic it would be unbecoming to dwell upon in this place, and we conclude by saying how deeply we are obliged to this important Congress for affording us the opportunity of describing and defining the part we play in the history of English sanitation.

DISCUSSION.

Mr. Mark H. Judge, A.R.I.B.A. (Paddington Vestry), heard with satisfaction of the continued progress of the movement under the enlightened initiative of the Plumbers' Company. There was, however, one remark in the paper read to which he was bound to take exception, viz., that in which it was asserted that the testing of plumbers' work was practically impossible after it was done. No one appreciated good plumbing more than the sanitary expert, and of all unskilled artizans in connection with sanitary work, none were so fruitful of mischief as the unskilled plumber; but supervision was necessary even with the most skilled registered plumber, and it was altogether a mistake for anyone to suppose that there was any difficulty in testing the work, and, indeed, he held it to be an axiom that, however skilled the workman, no sanitary work should be passed without being tested.

Dr. Hill (Birmingham) spoke of the necessity of improvement in the direction indicated by the action of the Plumbers' Company.

Mr. T. Anderton, as an operative plumber, agreed with the action taken by the Plumbers' Company. He thought that sanitary inspectors might, with advantage, be chosen from plumbers, as the latter were more practical than many of the former. The work of registering plumbers was rapidly extending throughout Great Britain and Ireland.

Professor Hay, M.D. (Aberdeen University), said that, as far as was known, plumbers were everywhere desirous of registration. The voluntary registration movement inaugurated by the Plumbers' Company had been very successful in Aberdeen, where most of the plumbers (masters and operatives) were registered. The classes held there for training young plumbers were well attended.

Professor Corbey, M.D. (Cork), spoke warmly in approval of the action of the Plumbers' Company, and gave instances from his own practice of serious injury to health arising from defective plumbing in houses. In some cases, the life of a patient depended more on the plumber than on the medical attendant.

Principal Garnett (Durham University), referring to Mr. Judge's remark, that there was no practical difficulty in inspecting plumbers' work, thought that the statement in the paper was intended to refer to the practical impossibility of inspecting "*repairing*" work carried out by a

journeyman who acted as his own foreman; with this statement he agreed. As the cost of training plumbers could not be supported through the Science and Art Department, a considerable portion of the funds available to local authorities or others for technical instruction should be devoted to the education of plumbers.

The following *Resolutions* were put to the meeting :—

On the proposal of the Chairman—

"That this meeting approves of the action of the Worshipful Company of Plumbers for improving the education and position of plumbers."

This was *carried* unanimously.

Proposed by Dr. George Reid, seconded by Mr. H. Alexander :—

"1. That the present conditions relative to the appointment of inspectors of nuisances are not calculated to secure the efficient administration of the Public Health and other Sanitary Acts, and that reform is urgently needed in the direction of increased salaries and allowances for travelling expenses in scattered districts; greater security of tenure of office; definition of size of districts as regards area and population that may be entrusted to one officer; the production of evidence of fitness in the shape of some diploma by all candidates for such appointments; and the limitation of the duties (except perhaps in the case of very small districts) to those purely pertaining to the office.

"2. That it is desirable to confine the appointments of inspectors of dairies, cow sheds, and milk shops and canal boats to inspector of nuisances.

"3. That a copy of the above resolutions be forwarded to the Local Government Board."

This was *carried*, with one dissentient.

De l'Organisation sanitaire en Espagne.

PAR

M. LE Professeur VILANOVA Y PIERA, M.D., Madrid.

C'est pour moi un vrai bonheur que d'avoir à remplir aujourd'hui devant vous le devoir qui m'impose la délégation officielle pour cette respectable assemblée dont mon gouvernement a bien voulu m'honorer. Je désire exposer à votre considération l'état présent et le prochain avenir du service sanitaire chez moi, précédé d'un résumé historique de tous les services rendus à la science par les médecins et naturalistes espagnols que j'estime de grande portée.

Deux puissantes raisons m'obligent à procéder de la sorte, d'abord mon poste officiel, et après le pur et vif sentiment de la patrie qui m'émerit de triste et douloureuse manière à la vue des injustes jugements

qu'en général porte l'Europe sur notre compte : Est-ce ignorance de notre développement scientifique ? Sont ces préjugés acceptés sans contrôle ? Tout cela ne saurait faire honneur à qui y croit encore, ni à qui le répète avec ou sans arrière-pensée. C'était compréhensible aux temps déjà lointains, où les peuples ne se connaissaient pas, privés de moyens rapides et faciles de voyager ; mais aujourd'hui, quand tout marche à l'union universelle, grâce aux merveilleuses conquêtes de la civilisation moderne, cette ignorance, ces préjugés peuvent-ils se concevoir ? Et cependant ils existent encore, car on méconnaît ce que nous autres Espagnols avons fait et continuons à faire ; et c'est pour cela que je viens réclamer devant vous la part de gloire qui de droit nous revient dans un service comme celui qui se rapporte à la santé publique, dans lequel il ne me sera pas difficile de démontrer que l'Espagne a devancé la plupart des autres nations. La méconnaissance de notre histoire scientifique se voit parfaitement dans les ouvrages sur l'histoire des sciences de Cuvier et de Blainville, lesquels à peine se permettent de nommer Arnaud de Vilanova, mon antécesseur, et Raymond Lullio, parmi les anciens, et des temps modernes ils n'en citent que très peu. En chose bien extraordinaire, les livres des deux savants français ont été publiés près d'un demi-siècle après la complète réfutation que l'insigne Abbé Cavanilles publia à Paris même et en français, de l'article de l'Encyclopédie dans lequel Masson osa dire que l'Espagne en fait de science n'avait rien apporté dans les dix siècles derniers. Le savant botaniste espagnol, bien connu par les nombreux travaux qu'il fit dans la belle science des plantes, démontra l'inanité de l'attaque et l'absolue ignorance sur laquelle se basait la calomnie de Masson, en lui présentant l'histoire succincte de tout ce que médecins, naturalistes, astronomes, mathématiciens espagnols ont fait et publié. Comment croire que Cuvier et Blainville avec leur immense érudition ignorassent l'existence de l'ouvrage de Cavanilles, le célèbre réformateur de la classification de Linné ? Désirant, donc, pour ma part de ne pas voir se perpétuer ces préjugés et cette ignorance, j'ose soumettre à votre considération le résumé historique suivant comme introduction à l'état actuel de l'organisation sanitaire en Espagne, car il y a aussi cette même ignorance et ces préjugés dans cette branche de l'administration espagnole.

Sans oublier ce que les Arabes espagnols et respirant l'atmosphère de l'Espagne ont si largement apporté au champ médical et des autres sciences naturelles, il suffirait de signaler la figure du profond humaniste et grand philosophe Jean Louis Vives, pour évaluer ce que les sciences d'observation doivent à mon pays, car il enseigna dans l'Université d'Oxford avant l'insigne Chancelier Bacon de Verulamio, et publia ensuite la véritable méthode que l'étude de ces sciences exige, et à laquelle elles doivent les extraordinaires progrès réalisés depuis lors. Ainsi le déclare l'érudit Mayans dans la biographie de l'auteur des ouvrages qu'il édita : *fodit Vives fundamenta firmissima ad veram philosophiam ædificandam, quam postea struxit Franciscus Baconus.* Sur le même écrivait Erasme à Moro : *de Ludovico Vivis ingenio gaudeo meum calculum cum tuo consentire, is est de numero eorum qui nomen Erasmi sint obscurati.* Ce fut une tête vraiment

privilégiée que celle de cet homme insigne, car elle lui permit d'embrasser avec une singulière perspicacité presque toutes les branches du savoir ; il devient à la fois le restaurateur des belles-lettres, et le premièr réformateur de la philosophie positive, car non content de signaler les causes de la décadence des sciences dans son temps, il indiqua bien clairement la manière de les corriger dans la suivante maxime, *ad incognita enim itur per cognita, et ad mentis judicium per sensuum functiones.* On doit aussi à mon compatriote la véritable méthode pour l'étude de la médecine, insistant beaucoup sur la nécessité de la baser sur la connaissance des sciences naturelles et de l'anatomie.

Il survint à Vives la même chose qu'à Michel Servet, véritable 1er indicateur non seulement de la circulation pulmonaire, mais aussi de la circulation générale, comme cela découle de ce qu'il dit dans son ouvrage de *Fidei restitutio*, et cependant la gloire de cette découverte en est induement attribuée à Harvey et à Cesalpin.

Mais ce ne furent pas ces deux hommes si célèbres, ceux qui dans les temps anciens et modernes ont contribué en Espagne au mouvement intellectuel de l'Europe, ainsi que l'ont démontré en 1795 le savant Cavanilles, et en 1853 l'actuel Recteur de l'Université de Madrid, Mr. Colmeiro, mon compagnon de l'Académie de Médecine, dans le mémoire intitulé La Botanique et les Botanistes de la Péninsule hispano-lusitanienne, couronnée par la Bibliothèque nationale. Des deux livres que je viens de citer j'en extrais les curieux passages suivants. J'aurai aussi recours à d'autres publications ; daignez, chers confrères, me prêter votre attention bienveillante.

Le nommé Arnaud de Vilanova s'occupa à une époque si reculée d'hygiène sous le nom de régime de santé, citant à ce propos diverses plantes et plusieurs substances médicinales.

Gonzalo Fernandez d'Oviedo écrivit et publia en 1535 à Séville la 1ère histoire générale et naturelle des Indes.

Le célèbre Laguna, Professeur à l'Université d'Alcala et Médecin de l'Empereur Charles V, établit le jardin botanique d'Aranjuez, antérieur à ceux de Montpellier et de Paris.

Nicolas Monardes, Médecin de Séville, créa un des premiers musées d'histoire naturelle avec les objets rapportés du Nouveau Monde, sur lesquels il écrivit un livre aussi curieux qu'intéressant.

Le Sieur Franco, Professeur à l'Université d'Alcala et plus tard dans celle de Coïmbre, est l'auteur d'un des 1ers livres sur les maladies contagieuses.

François Hernandez, Médecin de Philippe II, qui l'envoya à la Nouvelle Espagne où il resta depuis 1571 à 1577, et écrivit 15 volumes sur la géographie, les antiquités et les objets d'histoire naturelle.

François Valles, surnommé le divin Valles, fut médecin de Philippe II et auteur de nombreuses ouvrages de médecine.

Dans le 17me siècle sont dignes d'être connus Jean Castañeida, correspondant en Espagne du fameux Clusio.

Le Dr. Gimenez Gil fut auteur d'un ouvrage d'hygiène titulé Salubrité du Moncayo (montagne de l'Aragon), avec des notices sur ses plantes.

A la Bibliothèque nationale de Madrid se conservent encore les 7 volumes in-folio avec dessins coloriés, sur l'histoire naturelle des plantes, dus au Médecin Bernard Cienfuegos.

Le Médecin de Valence, Sorolla, publia un traité de botanique médicale, et forma dans cette université un herbier et y laissa beaucoup de manuscrits sur les plantes du pays.

Le 17e siècle termine et le 18e commence avec ce qui devrait bien s'appeler la dynastie des fameux botanistes du nom Salvador, dont le 1er fut Jean, pharmacien de Barcelone, auquel succéda Jacques, surnommé par Tournefort le Phénix d'Espagne; le 3ième fut un autre Jean, compagnon d'Antoine et Bernard de Jussieu dans les herborisations que par ordre du gouvernement français ils firent à travers la péninsule; Joseph et un autre Jacques complètent la liste de la célèbre famille.

Élève du 1er Salvador, le Pharmacien Minuart de Barcelone publia divers opuscules sur la belle science des plantes.

Le Jésuite Gumilla est l'auteur de l'Orénoque illustré, dans lequel il donna de curieux détails sur les productions naturelles du territoire de ce grand fleuve.

Les célèbres marins Ulloa de Séville, et Jorge Juan d'Alicante, en dehors de la part qu'ils prirent aux opérations géodésiques et astronomiques confiées aux académiciens français envoyés à Quito en 1735, fixèrent leur attention sur les produits naturels du pays, et publièrent le résultat du voyage dans les Notices américaines qui parurent à Madrid en 1772, et dans le Récit historique.

Un autre Jésuite, le Père Guevara, visita le Paraguay dont il écrivit l'histoire, ainsi que celle du Plata et du Tucuman.

Le Pharmacien du roi Ferdinand VI, Ortega, fut un des restaurateurs de la botanique chez moi; secrétaire perpétuel de l'Académie de Médecine, il fut chargé de rédiger les éphémérides qui se publièrent depuis 1738 jusqu'à 1746. Dans sa qualité de correspondant du grand Linné, il lui communiqua des notes et des dessins qui servirent pour la rédaction de l'*Iter hispanicum* publié en 1758.

Casimir Garcia Ortega, Médecin et Professeur de Botanique à Madrid, publia plusieurs ouvrages et la *Pharmacopœia hispana*, dans la plus importante partie. C'est à lui qu'on doit surtout l'établissement des jardins botaniques et des chaires dans les principales villes de l'Espagne, et l'organisation des expéditions destinées à explorer le Nouveau Monde.

Un autre Vilanova, Thomas, médecin de Valence, Professeur de Botanique et de Chimie, écrivit la *Flora valentina*, forma un magnifique et riche herbier avec les plantes recueillies dans les nombreux voyages qu'il fit en France, en Italie, en Allemagne et dans la Hongrie, et publia un livre sur matière médicale.

Ignace Asso, diplomate et jurisconsulte éminent, sut organiser un musée d'histoire naturelle à Saragosse, sa patrie, et publia de nombreux ouvrages sur la botanique, la zoologie et l'agriculture.

Joseph Celestin Mutis, grand botaniste, habile médecin et mathématicien distingué, fut le chef et le principal membre de l'expédition à

la Nouvelle Grénade, où il étudia la végétation, les mines dont il en exploita quelques-unes ; il s'occupa surtout de la flore de cette région, dont les précieux matériaux se conservent dans le jardin de Madrid. Il publia d'intéressantes études sur le Quinquina dans un journal de Sta Fé de Bogota, où il fit construire un observatoire astronomique qu'il sut diriger.

Antoine Palau, médecin catalan, auteur de grand nombre d'ouvrages, parmi lesquels il faut indiquer un Cours élémentaire de Botanique.

L'Abbé Cavanilles, un des botanistes les plus renommés de son temps, réforma la classification sexuelle de Linné ; fut l'auteur de l'*Icones et Descriptiones Plantarum*, 6 volumes in-folio, dont les nombreuses planches furent dessinées par lui-même ; et de la description du royaume de Valence sur le rapport géographique, géologique et des produits naturels et agricoles.

Antoine Marti, médecin catalan, fut le premier qui analysa l'air atmosphérique, ce qui lui valut des applaudissements des principaux chimistes de l'Europe. Il se distingua aussi par ses études et ses expériences sur les sexes et la fécondation des plantes.

Hypolithe Ruiz et Joseph Pavon, célèbres expéditionnaires et auteurs de la grandiose Flore du Pérou et du Chili. Ruiz publia en 1792 à Madrid la Quinologie, ouvrage qui fut bientôt traduit en plusieurs langues, et la description, avec des dessins des milliers d'espèces végétales par lui découvertes. L'Académie de Médecine de Madrid publia plusieurs mémoires de Ruiz sur des plantes médicinales.

François Balmis, médecin de Valence, apporta de l'Amérique en 1792 plusieurs racines d'Agave et de Begonie qu'il acclimata dans sa belle patrie, et publia en 1794 un livre très curieux sur les propriétés médicales de ces plantes. Mais à part des grandes explorations qu'il fit dans le Nouveau Monde, mon compatriote réalisa la plus extraordinaire expédition qu'on puisse imaginer, car il s'embarqua le 30 novembre 1803 dans le port de la Corogne dans un vaisseau de guerre, avec 22 nourrices et un nombre égal d'enfants, ayant fait pendant trois ans jusqu'à 50,000 vaccinations dans les îles Canaries, à Cuba et Porto-Rico, Caracas, Guatémale, Philippines et les possessions hollandaises et anglaises dans l'extrême Orient. A son retour Balmis fit publier une disposition royale pour la conservation du vaccin, et en 1814 publia un très remarquable règlement sur la matière.

Martin Sessé et Joseph Mociño effectuèrent depuis 1795 jusqu'à 1804, avec un brillant résultat, la grandiose expédition à la Nouvelle Espagne.

Félix d'Azara inaugure le 19ième siècle en publiant d' intéressants ouvrages sur les mammifères et les oiseaux du Paraguay et du Plata qu'il rapporta de ses voyages.

Étienne et Claude Boutelou se distinguèrent principalement par leurs études sur la botanique et l'agriculture.

Lagasca, Professeur dans le Jardin de Madrid, médecin et botaniste distingué, écrivit un Cours de Botanique, et publia à Londres, pendant son exil, l'*Hortus siccus Lundinensis ;* ce fut chez lui une constante préoccupation que de faire paraître sa Ceres, pour laquelle il avait

récueilli de nombreux matériaux avec l'efficace coopération de Simon de Rojas Clemente, orientaliste et savant de 1er ordre, élève du célèbre Abadia, qu'il devait accompagner dans son fameux voyage en Afrique. Clemente est l'auteur de plusieurs ouvrages, parmi lesquels il faut signaler l'Essai sur les variétés de la vigne en Espagne. Le Gouvernement de mon pays vient de faire publier une nouvelle édition de ce fameux livre, dans un in-folio avec de magnifiques planches.

Je ne veux pas abuser de votre bénévolence, car je crois que ce que je viens de dire suffit pour démontrer quelle part si importante ont prise dès les temps les plus reculés mes compatriotes au mouvement scientifique, tout en rendant des services signalés et spéciaux à la médecine. Quelle plus grande gloire pour l'Espagne que celle de l'introduction en Europe de la plupart des plantes médicinales et surtout du Quinquina par les nobles Comtes de Climatron et par leur médecin, Jean de Vega, en 1640? Peut-on décrire avec de plus vives couleurs une souffrance mentale que l'a fait notre immortel Miguel de Cervantes dans son Quichotte ?

Le fameux Cid Rodrigo de Vivar institua en 1067 le 1er lazaret, pour le traitement de la lèpre; le 1er hôpital de campagne fut établi à Grenade par les rois catholiques; et au Père Xofré on doit la création à Valence en 1409 d'un des premiers asiles d'aliénés. Dans le très ancien Code du Fuero-Juzgo, dans les lois appelées las Partidas, et dans les Institutions de l'Empereur Charles V on voit déjà les premières délinéations de ce qui avec le temps devait devenir la médecine légale et les règles pour l'exercice de la médecine.

Pourquoi donc, l'Espagne qui, d'après ce qui précède, a devancé bien d'autres nations dans des nombreuses branches du savoir, est-elle ignorée et maltraitée, même calomniée injustement? Plusieurs causes ont produit ce fâcheux résultat, n'étant pas assurément la moindre, la punible indifférence avec laquelle on regarde chez moi tout ce qui peut intéresser notre propre gloire; en général nous préférons réaliser les prouesses que vanter leur importance. La situation topographique y entre aussi pour beaucoup; mais la cause principale c'est, sans le moindre doute, les voyages qui ont fait surtout certains écrivains français qui n'ont fréquenté que les classes plus basses de la société, et qui voulant ensuite donner à leur récit un caractère original peignent les Espagnols avec les couleurs que leur fournit leur fantaisie. Il y en a qui portent le ridicule jusqu'à chausser ce qu'ils croient être leur propre cothurne, c'est-à-dire, chapeau bas dit *calañés*, pantalon à cloche soutenu par la *faja* ou ceinture à plusieurs tours et le couteau ou *navaja*. Tout cela, chers confrères, n'est pas moins ridicule que faux, et nous fait sourire, à nous les vrais Espagnols, qui sommes vêtus, comme vous voyez, comme les autres peuples de l'Europe, et qui nous intéressons autant que les plus enthousiastes pour le progrès scientifique. La passion politique et les puériles rivalités nationales ont contribué aussi à ce fâcheux résultat.

Or la même ignorance et les mêmes injustices existant encore lorsqu'il s'agit des affaires sanitaires espagnoles, je suis moralement forcé à exposer à votre savante considération, le présent et le prochain

avenir de l'organisation de cette branche administrative dans mon pays.

Le service sanitaire en Espagne est basé sur la division territoriale, laquelle est représentée par trois cercles concentriques, savoir, l'Etat, la province et le municipe, qui représentent l'unité dans l'entité juridique. Les provinces d'outremer se régissent par des dispositions spéciales: celles de la péninsule sont en nombre de 49, et les municipes 10,000 à peu près.

Les trois cercles sanitaires ont un élément consultif, un autre exécutif et un troisième qui s'appelle d'inspection. L'élément consultif est représenté par un corps délibérant qui répond à toutes les questions proposées par le pouvoir exécutif, auquel il peut aussi, par sa propre initiative, lui soumettre tout ce qui lui semble convenable à la santé publique.

L'élément exécutif suprême, responsable de l'application des lois, est représenté par le Ministre de l'Intérieur que nous appelons de Gobernation, secondé dans ses fonctions par un chef de bureau, c'est-à-dire, par le Directeur-Général de Santé et de Bénéficence, avec des employés subalternes chargés des diverses services terrestres, maritimes, de statistique sanitaire, etc.

Ainsi, donc, le pouvoir exécutif représente l'action, dont les ordres se communiquent aux Gouverneurs ou Préfets des provinces, et ceux-ci les transmettent aux Maires pour leur exécution. L'élément consultif illustre et conseille à la Direction de Santé et au chef suprême administratif, le Ministre; et l'inspection examine avec le plus grand soin et avec responsabilité tout ce qui se rapporte aux grands intérêts de la santé publique.

Pour le Ministre et le Directeur de Santé l'élément consultif est représenté par le Conseil royale de Santé et par l'Académie de Médecine. Les Gouverneurs et les Maires ou Alcaldes ont aussi cet élément qu'on les appelle Junta ou bien Comité de Santé, provinciale et municipale.

L'inspection est représentée par des individus du Conseil de Santé, par des médecins de véritable compétence nommés par le Ministre, lorsqu'il s'agit de remplir certaines fonctions de caractère ou d'ordre générale. Les Gouverneurs et les Alcades peuvent aussi nommer des inspecteurs provinciaux ou municipaux, sans qu'il existe pour ce service du personnel permanent.

On voit, donc, d'après ce qui précède, que toute résolution de l'élément exécutif, Ministre, Gouverneur ou Alcalde, porte toujours la garantie de l'élément consultif et d'inspection. Les Gouverneurs ont aussi des espèces de conseillers dans les Délégués de Médecine et Chirurgie, de Pharmacie et Vétérinaires, et dans les Douanes il y a des Inspecteurs spéciaux des denrées médicinales; et les Maires peuvent consulter avec les médecins et pharmaciens titulaires, qui prêtent gratuitement leurs services aux pauvres des villages.

Servent de complément à notre organisation sanitaire, l'Institut central de Vaccination, et le corps de médecins des bains et des eaux

minérales, et celui de la santé maritime, lesquels se régissent par des règlements spéciaux.

La loi actuelle, dont je viens d'en extraire, pour ainsi dire, l'essence, date de 1855 ; mais elle fut précédée d'une foule de dispositions sanitaires qui furent prises déjà dans des temps très reculés. Ainsi, par exemple, en 1546 on voit que dans les îles Baléares les autorités de Majorque venaient obligées, par une espèce de comité de santé, de faire connaître tout ce qui se rapporte à la santé publique ; les voyageurs et les marchandises ne pouvaient pas débarquer avant d'avoir exhibé la patente du lieu de provenance et le certificat de santé à bord.

A l'occasion de la peste de Séville en 1568, des cordons sanitaires furent établis ; les médecins venaient obligés de présenter note des malades et de ceux qui succombaient, dans le but de former la statistique sanitaire, qui commença alors à se realiser.

A Barcelone les mesures qui furent prises etaient très sévères, car le Commissaire de Santé pouvait condamner, même à la peine de mort, les contraventeurs des ordonnances.

On peut bien dire que le service sanitaire commença à s'organiser en 1720, lors de la terrible peste de Marseille. Ce fut alors qu'on institua la Junta suprême de Santé, composée de plusieurs conseillers de Castille. En 1740 s'ordonna la formation des listes de médecins et de chirurgiens ; et fut confirmé le Protomédicate qui avait été créé par les souverains Ferdinand et Élisabeth.

En 1780 Charles III disposa la création de l'École de Médecine de Madrid, laquelle porte encore le nom du fondateur.

En 1757 la Junta suprême de la Principauté de Catalogne ordonna la publication d'un projet de Règlement général de Santé qui a été la base de l'organisation actuelle. En 1766 la Junta de Cadix motiva la publication des ordonnances de santé terrestre et maritime, qui furent rédigées le 20 novembre 1804 par Benoît Puente. La fièvre jaune qui fit tant de victimes en 1807 et en 1821 à Cadix, Malaga, Tortose, Barcelone et dans d'autres endroits, fut, pour ainsi dire, la cause du Règlement général publié par la Junta suprême du Royaume ; en 1813 apparut la première loi organique de santé.

En 1814 commence à s'organiser le service des eaux minérales, et le corps de médecins chargés des établissements, lequel fut définitivement créé par décret royale en 1816, plus ou moins modifié en 1834, et par des dispositions postérieures.

Enfin, la réforme sanitaire de 1847, antérieure à celle de France et d'Italie, fut la dernière évolution sanitaire qui précéda la loi actuelle. On voit, donc, que l'Espagne, loin d'être en retard, a devancé dans cette branche de l'administration publique bien d'autres nations, que c'est ce que je voulais prouver.

La loi actuelle est assez bonne ; mais étant susceptible de perfectionnement, on a pensé à l'améliorer par le projet déjà approuvé par le Sénat et soumis aujourd'hui à la délibération du Congrès des Députés, et duquel on peut se former une idée en consultant le tableau ci-joint.

Nouvelle Loi sanitaire d'Espagne.

- **Titre 1er**
  - Chapitre unique
    - Fin et extension de la loi.
    - Division
      - Par sa propre nature
        - Santé terrestre.
        - Santé maritime.
      - Par son organisme
        - Administration centrale.
        - „ provinciale.
        - „ municipale.
- **Titre 2e. Santé terrestre**
  - Chapitre 1er. Hygiène publique.
    1. Aliments et boissons, marchés, établissements bromatologiques.
    2. Habitations, établissements publics, maisons pour dormir, constructions civiles.
    3. Rues, places, voies publiques, chemins de fer.
    4. Hygiène rurale, des forêts, Hygiène minière.
    5. Industries insalubres, industries dangereuses, d'autres industries.
    6. Conduction des eaux potables, évacuation des ordures, etc.
    7. Cimetières, transport des cadavres, dépôt, autopsie, inhumation, crémation.
    8. Abattoirs, crémation d'animaux, fumiers, marchés des bestiaux.
    9. Dispositions générales.
  - Chapitre 2e. Endémies, contagion, épidémies, épizooties.
  - Chapitre 3e. Sources minéro-médicinales.
  - Chapitre 4e. Vaccination et révaccination.
  - Chapitre 5e. De la pratique des professions médicales.
  - Chapitre 6e. Vente des médicaments, pharmacies, drogueries.
  - Chapitre 7e. Inspection des denrées médicales et autres.
  - Chapitre 8e. Statistique sanitaire et Démographie.
- **Titre 3e, Santé maritime**
  - Chapitre 1er. Des ports
    - Section 1ère
      - Partie 1ère. Déclaration de l'état sanitaire.
      - „ 2e. Visite aux vaisseaux nouveaux.
      - „ 3e. Visite à l'entrée des vaisseaux.
      - „ 4e. Des patentes.
    - Section 2e. De la libre pratique et des quarantaines.
    - Section 3e. Du service sanitaire dans les baies.
    - Section 4e. De la visite à la sortie des vaisseaux.
    - Section 5e. Dispositions générales.
  - Chapitre 2e. Des lazarets
    - Section 1ère. Des lazarets d'observation.
    - Section 2e. Des lazarets impurs
      - Partie 1ère. Conditions de ces lazarets.
      - „ 2e. Visite à l'entrée des vaisseaux.
      - „ 3e. Régime quarantenaire.
      - „ 4e. Visite à la sortie des bateaux.
  - Chapitre 3e. Statistique sanitaire maritime.
- **Titre 4e. Administration sanitaire.**
  - Chapitre 1er. Administration centrale
    - Administration active
      - Section 1ère. Direction générale de Santé et Bénéficence.
      - „ 2e. Inspection générale de Santé publique.
      - „ 3e. Délégations sanitaires en Orient et en Amérique.
    - Administration consultive
      - „ 1ère. Du Conseil d'État.
      - „ 2e. Du Conseil supérieur de Santé.
      - „ 3e. De l'Académie de Médecine.
  - Chapitre 2e. Administration provinciale
    - Administration active
      - „ 1ère. Inspection médicale, pharmaceutique et vétérinaire des districts.
      - „ 2e. Inspection des eaux minérales.
      - „ 3e. Institut de vaccination.
      - „ 4e. Inspection des ports et des lazarets impurs.
    - Administration consultive
      - „ 1ère. Conseils provinciales de Santé.
      - „ 2e. Académies de Médecine.

Titre 4e. Administration sanitaire.
- Chapitre 3e. Administration municipale.
  - Administration active
    - „ 1ère. Inspection médicale.
    - „ 2e. Inspection pharmaceutique.
  - Administration consultive
    - „ 3e. Inspection vétérinaire.
- Chapitre 4e. Organisation du personnel.
  - Des scalafons.
  - De l'accès dans la carrière.
  - De l'avancement dans la même.
  - Des droits.

Titre 5e. Des mesures disciplinaires et des peines.
Titre 6e. Des droits sanitaires.

Dans quelle Mesure l'État peut-il intervenir pour empêcher la diffusion de la tuberculose?

PAR

Signor Alfonso Corradi, Professeur à l'Université de Pavie.

I. La croyance à la contagion de la tuberculose, c'est-à-dire de la phthisie pulmonaire, est très ancienne et de bonne heure on a tâché d'en entraver la diffusion : on était arrivé, surtout dans le pays du midi de l'Europe, à la traiter presque comme une maladie infectieuse aiguë. Mais toutes ces rigueurs n'aboutirent à rien.

II. Les recherches et les découvertes modernes ont mit en évidence la contagion de la tuberculose, et en même temps ont démontré que cette contagion ne s'exerce que dans une atmosphère circonscrite, dans un rayon limité. Cela s'accorde parfaitement avec l'observation que la contagion arrive ordinairement où il y a une *cohabitation prolongée*, comme c'est le cas du marriage.

III. Mais, même dans ces conditions, la contagion ne s'effectue pas toujours; le germe ne suffit pas; il faut le terrain convenable, c'est-à-dire une certaine *prédisposition*, qui peut être acquise, ou bien héréditaire.

IV. La prophylaxie de la tuberculose doit donc combattre *l'agent de la contagion* et ses *moyens de propagation*, aussi bien que la *receptivité*. Mais cette prophylaxie est ce du domaine de l'hygiène privée ou de l'hygiène publique, de l'individu ou de l'état?

V. La mesure capitale (atteindre l'agent de la transmission) est hors de la portée de l'état; dont l'intervention ne peut être que indirecte, quand même il défenderait la vente de la viande et du lait des animaux tuberculeux, mode de transmission d'ailleurs, qui n'est pas définitivement demontré, et qui parait ne s'effectuer que dans des circonstances très particulières. Il ne reste à l'état que de s'appuyer sur l'hygiène générale qui a pour but, en fortifiant surtout les héréditaires et les debilités, de diminuer la réceptivité des individus.

VI. Mais la tâche de l'hygiène publique ne doit pas s'arrêter à donner de l'air pur, une alimentation saine et suffisante, à éloigner les causes d'insalubrité non, elle, doit s'allier à *l'éducation*, à qui appartient de donner à l'obéissance passive l'élan de la participation intelligente.

C'est l'éducation qui doit persuader de la necessité de remplir les obligations qu'impose la vie sociale, qui doit inspirer le devouement de sacrifier sa liberté, ses penchants au bien public. Ce sera l'éducation, pas la loi impuissante, qui donnera la prévoyance dans le choix des mariages, et la force morale de s'abstenir de continuer ses propres malheurs physiques dans une vie nouvelle, puisque l'hérédité est une sorte de contagion intérieure, plus sûre et impitoyable encore dans ses effets, que la contagion extérieure.

VII. Entre l'hygiène publique proprement dite et la privée il y a l'hygiène des diverses *collectivités*, telles que casernes, collèges, ateliers etc.; les autorités compétentes sachant les dangers que les tuberculeux peuvent y apporter, éviteront l'encombrement; elles se metteront en mesure d'avoir détruits les crachats et le pus avant leur dessiccation; elles pourront même séparer les malades des sains. L'hospitalisation des tuberculeux entre dans cette catégoire de mesures qui se placent entre le commandement de la loi et l'action individuelle.

Friday, 14th August 1891.

The Chair was successively occupied by
Mr. Shirley Murphy (London),
Dr. Pistor (Berlin),
Professor Corradi (Pavia),
Dr. Covernton (Canada),
Brigade-Surgeon Pringle, and
Dr. F. W. Barry (London).

An Illustration of the Advantage of the Isolation of Persons exposed to Infection afforded by a limited Outbreak of Typhus Fever in Leeds, during the Spring of 1890.

BY

J. Spottiswoode Cameron, M.D., B.Sc., Medical Officer of Health, Leeds.

A case of exanthematous typhus was heard of on the 24th of April 1890, and a house to house inspection was made.

On the 26th, five typhus patients from three other houses were sent into hospital.

On the 25th, four persons living in the house first heard of, and on the 26th, 10 living in the other infected houses were sent to our shelter for the sake of having their houses disinfected, and were there kept under observation. On the 27th, a sixth case was discovered a few doors from those last-mentioned, sent to hospital, and her husband sent to the shelter.

Thus, in the course of three days, 22 persons were dealt with, of whom seven were sent to hospital as cases of typhus, and 15 isolated in the sanatorium. Of these 15, three developed typhus in the sanatorium, and were transferred to hospital between the 29th of April and the 8th of May, their illness being due to infection received before we heard of the existence of the disease in the houses from which they came.

A few other cases also occurred afterwards in the borough, and the occupants of their houses were also isolated, but as they were removed to hospital earlier in the disease, no delay in notification having occurred in the latter cases; in only one other case was there a second development of fever in the family.

The total results were as follows:—From 11 houses, 12 patients were taken to hospital for typhus, and 34 persons isolated in the shelter. Four of these latter developed typhus within a fortnight of their having been so isolated. Of 16 cases thus under treatment, three proved fatal. There were two other cases dealt with, about which there was some doubt as to the exact nature.

The four patients who were taken ill during isolation were under medical observation, and were removed from contact with the other persons isolated as soon as their temperatures began to rise. Had they been at home, much valuable time would certainly have been lost, and probably these four cases would have led to a great many others. As it was, there is no reason to suppose that any new case of typhus received the infection after these dates from any of the houses dealt with on the 24th, 26th, and 27th of April. It is probable that the infection in the latter cases arose, previously to that date, from the house of a man removed on the 26th April, who had been ill from the 24th of the preceding month, but the exact nature of whose illness had not been recognised.

As immediate and complete measures of disinfection were taken on the premises on the 26th of April, no communication of infection after that date was at all likely. The month that was lost, however, before our hearing of the case made it extremely difficult to trace the exact method by which the infection had spread.

Compulsory Notification of Infectious Diseases.

BY

PHILIP BOOBBYER, M.B., Medical Officer of Health for Nottingham.

It is impossible with the limits of time and space at my disposal here to discuss adequately, or in all its bearings, the whole subject which such a title as this opens up before us. A brief sketch must suffice. My object will be to state a case plainly and simply for compulsory notification, to enable those who have had no practical experience of its working to form an opinion of its prospective value, and to show how frivolous and premature are the criticisms passed upon it before it has been fairly tried in conjunction with those preventive measures towards the development of which it is simply intended to stand in the relation of a means to an end.

By compulsory notification of infectious diseases we understand the legal obligation to send immediate notice respecting the occurrence of certain infectious diseases to the sanitary authority of the district in which the affected person or persons are for the time being resident, together with a few particulars of place and people for the guidance of the authority. Different persons have been made responsible for the performance of this duty under the several Acts and Provisional Orders.

In one small class the householder alone is mentioned, he or she being solely responsible to the sanitary authority. This system of so-called householder notification has been tried in some three urban districts, of which the town of Greenock is one, and has proved a complete failure in all. The cause of the failure is not far to seek. The majority of people do not care to notify unless compelled to do so. Under this system there is practically no compulsion, for in the event of prosecution for neglect to notify, the onus of proving a guilty knowledge on the part of the responsible layman rests with the authority, and such proof in the majority of cases is not very readily obtainable. A case has recently occurred in Nottingham where a man in good position sent a servant from his house in the town to her home in the country while suffering from scarlet fever contracted through attendance upon his child, but in which a prosecution has had to be abandoned, because it was found impossible to produce legal evidence of a guilty knowledge of the girl's condition on the part of the master, without using means to obtain it which public authorities in such cases are naturally loth to adopt. This prosecution was instituted under section 126 of the Public Health Act, 1875, but had it been a case of simple failure to notify the sequel would have been the same.

All those systems under which the householder and medical attendant have been made in any way separately responsible for notification to the

sanitary authority or their officer, have been classed together as belonging to the so-called "dual" system, but in theory these systems were sufficiently various. For instance, in two large towns, Edinburgh and Aberdeen, there was no obligation upon the householder to notify unless a medical man had been called in. In five towns he was exempted only if a medical man had been called in. In 37 towns he was required to notify in any case. Under Mr. Ritchie's Act the duty of notification devolves equally and invariably upon both householder and medical attendant. In practice, however, it has been found that, by the tacit consent of all parties, every variety of this as of other theoretic systems quickly resolves itself, when a medical man is in attendance, into notification by him alone. The accuracy of this statement has, I know, been recently called in question, but it is borne out by the unanimous testimony of all those who have had practical experience in the matter.

The "single" system, so highly lauded by the opponents of the "dual," has been tried in three considerable towns only, viz., in Bradford, Norwich, and Nottingham.

Under it the medical attendant is required immediately after diagnosis to fill up and hand to the householder a printed notification form, which the latter in turn is directed to transmit forthwith to the sanitary authority. So much for the theory of the system. In practice, as I have already said, the notification is left entirely to the medical attendant, who keeps his book of forms at home, and sends his certificate direct to the medical officer of health.

In Nottingham I have found that out of 1,508 consecutive notifications, 1,360, or 90 per cent., were made by the medical attendant as above stated; 9, or ·59 per cent., by the householder in the manner prescribed by law, and the balance, less than 10 per cent., by myself, by officers of my department, by the police, by the clergy, or by neighbours of the affected families.

Before the passing of Mr. Ritchie's Act of 1889, which was made compulsory for all London, but optional elsewhere, compulsory notification was in force under local Acts or Provisional Orders duly confirmed in 56 urban districts of England and Scotland. Although local powers for its practice were obtained in some cases as early as 1876 it did not come practically into operation except in a few cases before 1882. Of the 28 greater English towns, including the metropolis, 17 had adopted it prior to 1889, and 11 had not, London being among the last.

In only a comparatively small number of the towns was a complete schedule of notifiable diseases adopted from the outset. In most cases an experiment was first made with two or more diseases, and others were afterwards added to the list. To take the case of Nottingham; compulsory notification received legal sanction in 1878, but was not put in force until 1882. Small-pox and scarlet fever were made notifiable in 1882, enteric and typhus fevers in 1883, and cholera and diphtheria in 1885. This limitation was doubtless in some measure due to the inconvenience experienced in some towns which, like Jarrow,

had adopted "the compulsory notification of infectious diseases" without sufficient definition of the last term.

The diseases more commonly notified under local Acts have been small-pox, cholera, typhus, scarlet fever, diphtheria, and typhus fever. Under the Act of 1889 membranous croup, erysipelas, relapsing, continued, and puerperal fevers have been added to the above. Power has also been given to sanitary authorities, with the sanction of the Local Government Board, to further expand the list by the inclusion of other infectious diseases, such as whooping cough and measles.

There is doubtless much yet to be learnt from the systematic study of the prevalence and fatality of many diseases of this class in conjunction with varying conditions of social and physical surrounding, of climate, season, soil, and food supply, and therefore ample grounds for adopting a general notification and registration of cases.

We must, however, guard ourselves, as well as warn the public, against supposing that the notification of all such diseases necessarily carries with it in any measure an element of prevention. The health records of our large notification towns during the past few years prove that for the present, at any rate, such is not the case.

The excellent diagrams handed in by Dr. Thorne Thorne to the Vaccination Commission, and published in their first report in 1889, show at a glance the range of mortality during the past 40 years, from several diseases in this list, for England and Wales, and are well worthy of a careful study.

Against only a very small section of this so-called zymotic class of ailments have suitable preventive measures been adopted, and in their case alone has there been a decline of prevalence and fatality.

There are, of course, a certain number of septic diseases which are found to diminish directly, as *a priori* we should expect them to, with improved sanitation; it is otherwise, however, with such complaints as whooping cough, measles, and even diphtheria.

The first two are apparently amenable to nothing but isolation, and for them this has never up to the present been seriously attempted. The issue of printed and verbal warnings, and the occasional closure of a school, may comfort the public, but they have very little effect upon the spread of these diseases in crowded urban districts at any rate.

Diphtheria, whatever may be the conditions under which it arises, or which are most favourable to its propagation, undoubtedly spreads very largely by personal contagion, and prophylaxis without means of isolation is practically of no avail. But, means of isolation provided, the difficulty remains of determining the diagnosis of mild and doubtful cases. The number of notified cases which it is found necessary on subsequent inquiry to eliminate from the notification register is larger with diphtheria than with any other disease.

This difficulty seems likely to be a serious hindrance to the effectual preventive treatment of diphtheria, and the disease is steadily

and ominously on the increase in London and many other town districts.

Enteric fever is undoubtedly fostered by insanitary conditions, and on this assumption its notification in any house or locality is often made the occasion of inquiry, inspection, and remedial action, but to what a limited extent only such action is possible the condition of the poorer parts of many of our large towns too plainly testifies. A great deal of endemic typhoid fever is often required, for instance, to induce a sanitary authority to recognise the desirability of abolishing midden-privies, of re-organising a defective system of drainage, or of providing a public water-supply. Much of the work, too, which passes for sanitary improvement in our towns is open to the suspicion of belonging to the order of innovations which are not improvements. For instance, it seems to me of very questionable advantage to seal the surface of roadways, yards, and passages lying over refuse material, frequently containing much organic matter, which has been used to raise the level of low-lying ground, and to leave the basements of houses built upon the same soil entirely without protection against the access of ground air; yet this is often done at the present time. When we consider also that leakages from sewers, cesspools, privies, and gas pipes are by no means of infrequent occurrence, the possible danger from such a practice assumes additional magnitude. There is, however, one fact worthy of notice in connexion with typhoid fever for which we should be grateful. Whether it be in town or country there is seldom much difficulty in securing its notification. Impressed with the belief that some discoverable cause must exist, both the medical attendant and his clients are for the most part too anxious to secure its removal to think about concealment of cases.

Scarlet fever and small-pox are the two diseases against which, in recent times, prevention has chiefly directed its energies. Vaccination, isolation, and disinfection in the first, and isolation and disinfection in the second, are the agents by which it has worked.

In the case of small-pox, so great is the popular dread of the disease, that but little difficulty has been experienced in enforcing either vaccination or isolation, or both together, according to the trend of local opinion. The value of notification, when associated with isolation, quarantine, and disinfection, completely carried out, finds striking illustration in the immunity of Leicester from small-pox in recent years. With scarlet fever the case is different. Many towns are now supplied with a large amount of hospital space specially provided for it, and a considerable number of patients are undoubtedly isolated, but even in the case of those towns furnished with the best and most ample accommodation the actual proportion of admissions to total cases has, until quite recently, been exceedingly small. The following figures for Nottingham, where a large number of scarlet fever beds have long been provided in the town isolation hospital, strongly support this contention.

Year.	Number of Cases notified.	Number removed to Hospital.	Per-centage of Removals.
1882*	1,029	56	5·4
1883	456	6	1·3
1884	370	24	6·4
1885	390	47	12·0
1886	351	51	15·0
1887	615	275	45·0
1888	643	318	49·0
1889	1,047	745	71·0
1890	963	800	83·0

* First year of compulsory notification.

Isolation hospitals then have existed in the majority of our large towns for many years past, but their accommodation has not been sufficiently good or ample and they have not been at all generally used, except for such diseases as typhus and small-pox, until within the past few years. A study of the recent health reports of almost any of these large towns will show the truth of this, and will further suggest that the practical adoption by the general public of the principle of hospital isolation in lieu of home nursing, even in the case of those diseases for which many hospitals are now specially provided, must not be looked for at once. These hospitals have too often been temporary structures of a comfortless if not forbidding aspect, economy in building with a view to early destruction (which was seldom carried out), having been the object of first consideration with the builders. That, however, was a mistaken policy; the hospital must be made, if possible, more attractive and healthier than the home. When this is done, as I am pleased to say, in some cases, it now has been, we shall begin—slowly at first, but certainly and completely in the long run—to secure the end we have in view, viz., the general acceptance of the principle of hospital isolation for the infectious sick of all classes.

Recent experience has taught us that permanent hospitals, replete with every modern comfort and convenience, can readily, and much more readily than the temporary buildings, be kept clean and healthy, and they may with certain precautions be safely used alternately for different diseases. The required ratio of beds to population has been variously stated. Dr. Buchanan, in 1876, laid it down that one bed per 1,000 would probably be the general requirement of the country as a whole. His estimate has been considered excessive, but if it has actually proved to be so in any instance, this will probably have arisen through neglect to use the hospital, and not through a lack of suitable cases for isolation.

In estimating, however, the amount of hospital accommodation required by any particular locality it is always necessary to take into consideration such points as the class, occupation, and density of the population, and the local history of endemic and epidemic disease, the mere mention of which are sufficient to suggest the impossibility of laying down a rule applicable to all cases.

The statistics for the country as a whole, as well as those for particular localities, as I have already stated, all go to show that the only modern zymotic diseases which have declined during recent years are (*a*) those which are known to depend on insanitary conditions for their propagation, and which, therefore, the improved sanitation of modern times will have had the effect of reducing, and (*b*) those among the personally contagious class for which isolation, and, in the case of small-pox, vaccination, have been practised.

It is altogether too early at present to attempt to estimate the full potential value of notification by an appeal to statistics, but adopting the criteria mentioned above, they are found to yield a result by no means unfavourable to it. Scarlet fever and small-pox have markedly declined in the majority of the notification towns.

If we compare the scarlet fever death-rates of the 10 larger notification towns mentioned above in the nine years 1873–81, prior to notification, and in the nine years 1882–90, subsequent for the most part to its adoption, with the corresponding rates of the remaining nine non-notification towns, of which particulars are given by the Registrar-General, we obtain a result strikingly in favour of the former group. I give averages of the death-rates, and not average rates, in order to make due and proportional allowance for the varying experience of separate populations of widely different numerical values.

This method applied to the case under consideration has, I am aware, met with criticism from professional statists, but I fail to see how the value of the figures for different towns of various sizes which have made the experiment of exercising certain precautions against the spread of infectious disease under different circumstances of liability, incidence, fatality, and the like, with different degrees of efficiency, can be duly expressed without it. In denoting chemical results, the prices of articles in daily use, the liability to crime among the several classes of society, such a method is accepted without cavil. Why not here?

TEN NOTIFICATION TOWNS.

Average of the death-rates, 1873–81	0·93
Do. do. 1882–90	0·37
Decrease per cent.	60·3

	Increase or Decrease per Cent. in the Scarlet Fever Death-rates during the Nine Years 1882–90, as compared with 1873–81.
Bradford	−76
Norwich	−83
Nottingham	−60
Portsmouth	−77
Leicester	−60
Manchester	−49
Salford	−48
Oldham	−69
Sunderland	−66
Newcastle	−66

NINE NON-NOTIFICATION TOWNS.

Average of the death-rates, 1873–81 - -	·87
Do. do. 1882–90 - -	·44
Decrease per cent. - - - - -	49·5

	Increase or Decrease per Cent. in the Scarlet Fever Death-rates during the Nine Years 1882–90, as compared with 1873–81.
Brighton - - -	− 38
Plymouth - - -	+ 138
Bristol - - -	− 60
Wolverhampton - -	− 74
Birmingham - -	− 71
Liverpool - - -	− 54
Leeds - - -	− 31
Sheffield - - -	− 37
Hull - - -	− 66

The figures for small-pox, as might perhaps have been expected, are more favourable even than these, although I have included those for 1880 and 1881 in the last group, in order to introduce the epidemics of those years.

TEN NOTIFICATION TOWNS.

Average of the death-rates, 1873–82 -	0·067
Do. do. 1880–89 -	0·035
Decrease per cent. - - -	48

NINE NON-NOTIFICATION TOWNS.

Average of the death-rates, 1873–82 -	·071
Do. do. 1880–89 -	·048
Decrease per cent. - - - -	36

If we take the numbers of deaths instead of the death-rates, the results obtained are nearly identical. The average decrease per cent. in the deaths from scarlet fever for the nine non-notification towns is −46 (that for London being also the same), and the average decrease in the 10 notification towns −55.

The corresponding small-pox figures are: for the nine non-notification towns −36, for London −71, and for the 10 notification towns −52.

The advantages to be gained from notification are so many and so great, and at the same time so manifest, that it would be an act entirely of supererogation to offer to demonstrate them by an appeal to statistics, were it not that attempts have been made to discredit the whole system by such agency.

It must be apparent to any thoughtful person who devotes attention to the subject, that notification, with isolation, disinfection, and the whole armament of sanitary precautions, are the natural and legitimate outcome of evolution as applied to preventive medicine. Powers have

been conferred under the earlier Public Health Acts which it would be impossible to exercise with due advantage to the community without the help of such a measure as compulsory notification. By it the sanitary authority is simply made aware of the existence of diseases which are known to be more or less preventable, which it is everyone's wish to prevent, and with the spread of which the authority alone possesses the means to cope.

Whatever the suspected vehicle of contagion, whether it be air, food, water-supply, or household fomites, officers of the authority alone can make effectual investigation, and enforce the observance of necessary precautions. They alone can keep watch over the sources of water, milk, and food, can act upon the suggestions afforded by concentration of cases around schools, factories, and the like places, or among the customers of milk sellers and other tradesmen. They alone can secure the reform of insanitary conditions found in connexion with those diseases known to be fostered by such agencies. In fact, I repeat that it must be apparent to all, who have eyes to see, that the sanitary authorities alone can exercise due control of infectious diseases as affecting the community, and that without compulsory notification any such work that they do must be done at a great disadvantage.

The history of compulsory notification has hitherto failed to justify the evil predictions that have been made concerning it. Medical men continue to notify, and yet retain the confidence of their patients. In many cases they are glad to have removed from their shoulders the responsibility of deciding upon the precautions to be taken. Only a very small proportion of cases are concealed, and most deaths from infectious diseases are certified correctly. Friends and neighbours, clergymen, and others, it must be remembered, are often alive to the necessity of reporting cases, even if the persons directly responsible are not.

In non-notification towns, owing to the facilities for concealing cases during life, it will often happen that deaths are certified as due to complications instead of the original disease. I have known this to occur on more than one occasion, and can conceive the possibility of its more or less general practice where sufficient inducement exists. However this may be, it certainly stands to reason that the small amount of concealment that is possible in towns with notification, will be less injurious to the community than the general concealment that is going on in those without it.

All the arguments urged against compulsory notification bear the impress of the weak case that lies behind them. Like every other desirable innovation, it was and is certain to meet with opposition, but the opposition it now has to face is as nothing compared with the storm which attended its first introduction, or that even of civil registration.

When compulsory notification was first adopted in Nottingham, the whole local profession rose in arms against it. During the present year an opponent of the new town hospital scheme, in a full meeting of the Medical Society, was unable to find a supporter in criticising the work of compulsory notification and isolation in Nottingham. Let us not

fear opposition. No good cause ever yet throve without it, and that our cause is good we have evidence in the fact that its sole aim is to promote the health and welfare of the community.

Should Compulsory Notification be made General?

BY

D. Biddle, M.R.C.S., Eng.

The question upon which I have undertaken to make a few remarks is this: "Should Compulsory Notification be made general?" And, at the outset, I would ask you to dismiss from your minds, as far as possible, all prejudices and prepossessions on the subject, and endeavour to view the question scientifically. Compulsory notification has been in the crucible for the last 15 years, and I am going to give you very briefly a qualitative and quantitative analysis of the results which have followed the experiment in the large towns of England.

What effect has compulsory notification had upon the death-rates, general and zymotic? The 28 large towns of England afford an admirable field in which to observe, since until last year, 11 (including London) remained under no system of notification, and 14 had, for four years at least, been under the dual system, which, as I have said before, is the system embodied in the Notification Act of 1889, which throws the burden of notification upon the medical attendant chiefly, and upon the householder only nominally.

Taking the seven principal zymotic diseases, four are *notifiable*, namely, small-pox, scarlet fever, diphtheria, and "fever" (chiefly enteric), and three are *non-notifiable*, except in rare instances, namely, measles, whooping-cough, and diarrhœa. In regard to 20 of the large towns, I have calculated the requisite death-rates, corrected by the recent census returns, for a period of 20 years, 1871–90; and those of the 8 additional towns for nine years, that is to say, from 1882, the earliest year for which in their case the Registrar-General gives us the needed data. I have also prepared various group-averages, by the aid of which results can be compared in groups of towns having populations extending to millions on either side, and for a period long enough to enable us to arrive at an accurate judgment in the matter. This period begins five years before the Public Health Act of 1875 came into force, also before the Vaccination Act was rendered more stringent. Thus, the effects of those sanitary measures can be compared with the results of the later system.

In the first place, however, it may be well to indicate, as far as practicable, what proportion of deaths the several kinds of infectious disease have been answerable for, irrespective of notification, in the 20 large towns of which we have full data. Taking the average of the whole period of 20 years, out of 1,000 deaths 161 were certified as due to zymotic disease, and, of those, 59 as due to the notifiable class, namely, 10 to small-pox, 26 to scarlet fever, 7 to diphtheria, and 16 to

"fever" (chiefly enteric); whilst measles accounted for 25, whooping-cough for 30, and diarrhœa for 46. But great changes have taken place in the proportions during the period of 20 years, which can best be exhibited by giving the numbers per 1,000 *deaths* for each of the four quinquennia in succession:—

——	1871–75.	1876–80.	1881–85.	1886–90.
Total zymotic - -	193	165	150	137
Notifiable zymotic -	87	63	52	37
Non-notifiable zymotic -	106	102	98	100
Small-pox - -	25	8	7	1
Scarlet fever - -	33	33	23	15
Diphtheria - -	4	5	8	11
Fever - - -	25	16	14	10
Measles - - -	20	22	28	30
Whooping-cough -	30	34	30	28
Diarrhœa - -	56	46	40	43

We shall see, presently, how much, or rather, how little of the improvement here apparent in regard to notifiable diseases is due to the system of compulsory notification embodied in the Act of 1889. I may mention that during the last of the four quinquennia, 1886–90 (the only one strictly allowed us for comparison) the proportions in the 28 large towns were almost identical with those above given for the 20 towns taken separately.

Turning now to the death-rates per 1,000 *living* in the same 20 towns, we find that the means for the four quinquennia, (1) from all causes, (2) from zymotic diseases as a whole, and (3) from notifiable diseases, were as follows:—

——	1871–75.	1876–80.	1881–85.	1886–90.
All causes - -	24·81	23·26	21·84	21·19
Total zymotic - -	4·79	3·84	3·27	2·91
Notifiable zymotic -	2·17	1·47	1·13	0·78

From this we see that a large part of the reduction occurred before notification appeared on the scene, and much more before the dual system had made its way in the towns. They must be infatuated notificationists, indeed, who will take credit to themselves for the marked reduction in the death-rate from small-pox, which was actually 2·07 in the year 1871, but on the average only 0·023 in the last quinquennium, notwithstanding the high rate in Sheffield during two of the five years. If the notificationists do take credit for this, I beg respectfully to differ from them. During the 20 years, the blanks—indicative of *no deaths* from that disease—are almost, if not quite, as numerous outside the area of notification as within it. Moreover, of the seven chief towns which came under the dual system by local Acts, Manchester was the only town which had not recorded numerous blanks before notification was introduced; and even in the case of Manchester there were two

years, prior to notification, in which the death-rate from small-pox was 0·00, and two more in which it did not exceed 0·01. In the pre-notification period, Sunderland had 7 blanks, Portsmouth 5, Newcastle 5, Salford 2, Oldham 2, Leicester 5. No, I cannot believe that the Congress will endorse any such claim as that to which I have adverted, so far as small-pox is concerned. The reduction in the death-rate from that disease has been due to a far more potent factor (for good) than notification. As to the other notifiable diseases, I think I can, if time be allowed, make the matter equally clear.

Now, there were four years, 1886–89, in which 14 of the large towns had the full benefit of the dual system, in a form matured by several years' experience; and it so happens, that not only for these four years, but for the four years immediately preceding them, the Registrar-General has supplied us with full data in regard to all those towns. The 14 towns referred to, are the seven above-mentioned, and in addition, Bolton, Blackburn, Derby, Preston, Huddersfield, Birkenhead, and Halifax. Together they form Group III. of my tables; whilst Group II. consists of the three towns which came under the single system only, namely, Bradford, Norwich, and Nottingham; and Group I. consists of London, Bristol, Wolverhampton, Birmingham, Liverpool, Sheffield, Hull, Plymouth, Brighton, Leeds, and Cardiff, which 11 large towns of England remained under no system of notification until after the passing of the Notification Act of 1889. Brighton and Leeds maintained their independence through 1890, and Leeds does so still, I believe. It is a singular circumstance, that these two towns, Brighton and Leeds, continued to decline in their death-rates from notifiable diseases in 1890, whilst the other provincial towns of Group I. ran up, except Plymouth, which had a preternaturally high death-rate the year before, owing to the epidemic of scarlet fever. London declined from 0·72 in 1889 to 0·70 in 1890, but Bristol ran up from 0·37 to 0·40, Wolverhampton from 0·33 to 0·35, Birmingham from 0·61 to 0·75, Liverpool from 1·18 to 1·55, Sheffield from 1·11 to 1·21, Hull from 0·37 to 0·39, and Cardiff from 0·39 to 0·40; whereas Brighton declined from 0·42 to 0·33, and Leeds from 0·72 to 0·64. Of course, I do not attach much importance to this, but even a straw will show the direction of the wind, and it is quite clear that, so far as 1890 is concerned, the large towns which adopted the Notification Act derived no benefit therefrom.

Coming now to consider the four years preceding 1890, namely, 1886-89, I am able to show that the group-average death-rate from notifiable diseases of the 14 large towns under the dual system was higher than that of the 11 large towns under no system of notification, not only in one of the four years, but in each of the four years! In 1886, the respective death-rates of the two groups from notifiable diseases were 0·775 and 0·639, showing that the towns under the dual system lost, in that year, 136 per 1,000,000 more persons from notifiable diseases than died of the same diseases in the towns under no system of notification. In 1887, the respective death-rates were 1·009 and 0·816, showing an excess of 193 per 1,000,000. In 1888, the respective death-rates were 0·905 and 0·778, showing an excess of 127 per

1,000,000. In 1889, the respective death-rates were 0·933 and 0·771, showing an excess of 162 per 1,000,000. Taking the respective mean death-rates from notifiable diseases in the two groups during these four years, which I find to be 0·906 in the 14 towns under the dual system, as against 0·751 in the 11 towns under no system, it is apparent that the average excess on the part of the former group was 155 per 1,000,000 per annum. In other words, for equal populations the loss from the four notifiable diseases, taken together, was more than 20 per cent. greater (to be precise, 20·6 per cent. greater) in the towns under the dual system than in the towns under no system of compulsory notification whatever. Yet the latter group had a denser population, 40·04 persons to the acre (in 1881), as against 26·95 in the former group; and I beg you to observe that the state of things which I have described was a reversal of previous relations between the same towns. Not only was the death-rate from what we call notifiable diseases lower in the seven chief towns of Group III., than in the nine provincial towns of Group I., during the first quinquennium of the 20 years under present review (2·591 as against 2·693), but even so lately as during the period of four years, 1882-85, immediately preceding that grievous period of equal length just considered, the 14 towns of Group III., as a whole, had a better, that is, a lower death-rate from those diseases than the 11 towns of Group I. as a whole, the respective mean rates for that period being 0·934 and 1·087. At the beginning of that period, however, five of the 14 towns of Group III. had not come under the dual system, namely, Sunderland, Portsmouth, Newcastle, Salford, and Halifax. Not until its close were they completely under the system, and then, as we have seen, the tables were turned, there was a signal *volte face* on the part of the two groups. In 1885, the superiority of Group III. was fast disappearing, its notifiable zymotic death-rate being then only 9 per 1,000,000 better than that of Group I. (0·757 as against 0·766). When Group III. came completely under the dual system, its superiority in this respect was a thing of the past, unless, indeed, under existing circumstances, it may again re-assert itself. Group I. has not yet had time to suffer the full penalty of its defection from the path of safety and distinction.

The particular notifiable diseases which led to the comparatively high death-rate of Group III. in the second period of four years, were scarlet fever and the class entitled "fever" (chiefly enteric). Thus, whilst the mean death-rate from scarlet fever, for 1886–89, of Group I., under no system of notification, was 0·301, that of Group III. was 0·405 (more than 31 per cent. in excess); and whilst the mean death-rate from "fever" for the same period was 0·192 in Group I., it was 0·297 in Group III. under the boasted dual system (more than 54 per cent. in excess). In small-pox and diphtheria, Group III. had the advantage, though a slight one: in small-pox, 0·016 as against 0·033, both very low; and in diphtheria, 0·188 as against 0·225. But to show that compulsory notification has little effect in restraining diphtheria, I need only mention that the death-rate from this disease has increased greatly in the towns under the dual system, as well as in those under no system;

but London, Manchester and Salford, Portsmouth, and Plymouth seem to have suffered most from it of late. In the 20 towns the death-rate from diphtheria in 1886–89 was greater than from "fever" (0·218 as against 0·212), but in the 28 towns slightly lower (0·209 as against 0·219). It seems to be a disease attributable to misdirected sanitation rather than to the absence of sanitary arrangements. Cows and milk, and the kissing of cats, had place in the world before diphtheria became so common; but open gratings, imperfect gulleys and traps, and sewer ventilation generally, are of comparatively recent origin. Diphtheria has increased as typhus and typhoid have declined, but the death-rate from the two classes combined is not nearly so great now as that from "fever" alone formerly.

A further contrast between the two periods of four years, 1882–85 and 1886–89, will show that compulsory notification and its abettors have much to answer for. In Group I., under no system of notification, the number of deaths from zymotic diseases as a whole was lower in the second period than in the first by 10 per cent., although the population had advanced 4 per cent. In Group III., on the contrary, the number of deaths from zymotic diseases advanced with the population *pari passu*, both increasing 7 per cent. In Group I., the number of deaths from notifiable diseases declined 28 per cent., whereas in Group III. there was a rise of 4 per cent. In Group I. the deaths from scarlet fever declined in number 35 per cent., but in Group III. they increased in number 3 per cent. In Group I. the number of deaths from "fever" declined 32 per cent., but in Group III. only 12 per cent. Is not this sufficient to show that the decline in death-rates, which had been almost universal in this country, received a serious check in those towns which came under the dual system of notification? There cannot be two opinions about it. Nor must it be imagined that the group to which London belonged would on that account necessarily appear to advantage, for London did not in all respects surpass the provincial towns of Group I. The latter declined in the number of deaths from scarlet fever 37 per cent., whilst with London included, the group declined only 35 per cent.; and in the case of "fever," the provincial towns declined 33 per cent. in the number of deaths, as against 32 per cent. on the part of Group I. with London included, upon a comparison of the two periods of four years above mentioned.

A very good way of showing the true progress made in any group, and also in any single town, is to compare the mean death-rates in yearly descending quinquennia. I have done this for London and the nine chief provincial towns of Group I. taken together, for the nine provincial towns taken by themselves (leaving London out), and for the seven chief towns of Group III. taken together, so as to see how the several groups have progressed from the period 1871–75 to 1886–90. By the method adopted a continuous decline appears unless the death-rate of some year be higher than that of the fifth year preceding. The general death-rate of the nine provincial towns of Group I. is thus shown to have declined without any serious break—the death-rate of no year having been higher than that of five years before—until 1890 was

reached, when the group having come under the dual system almost entirely, the tide turned, and the death-rate from all causes was higher than it had been for 12 years (1878). The death-rate of this group from notifiable diseases declined regularly also from 1878 onwards until 1890, when it rose conspicuously above the rate of the fifth year preceding, though not above one of the years intervening. In regard to scarlet fever, the seven chief towns of Group III. began with a mean death-rate 71 per 1,000,000 lower than that of the nine provincial towns of Group I., were higher by 12 per 1,000,000 in 1885–89, but again lower by 109 per 1,000,000 in 1890, when most of the towns of Group I. had come under the Notification Act. In regard to "fever," the seven towns of Group III. were lower than the nine provincial towns of Group I. by 29 per 1,000,000 in 1871–75, but higher by 75 per 1,000,000 in 1885–89, which difference was not reduced in 1890, having been dependent upon a comparative state of things not to be altered in a day, or even a year.

The above is a brief outline of what my tables, drawn up on a very elaborate scale, prove. In addition, I went into the subject of *uncertified deaths*, and found that during 1886–89 the per-centage of these to total deaths was higher in Group III. than in Group I., the mean per-centages being respectively 2·84 and 2·01. But I do not press this, because there is no proof in my possession that the uncertified deaths were, any of them, due to notifiable diseases, or that they increased in number by reason of notification.

Now, if the difference which I have sketched, between Group I. and Group III., was due, as maintained by some, to the better means of isolation possessed by the former, which I am far from admitting, it only shows that compulsory notification is not needed, that the people will avail themselves of the proffered benefit without being dragooned. But I maintain that the figures produced (by no means all I have of a similar kind) strongly condemn the dual system of notification, as hitherto carried out in the large towns of England, and make it difficult to understand how the Infectious Diseases (Notification) Bill came to be promoted in 1889, much less passed. The facts I have adduced were within the reach of anyone who chose to investigate the matter, and they make the failure of the system one of moral certainty, if not of demonstration.

Nor need we wonder at it. The principle of the dual system is dishonouring to the profession. It is a commingling of official with private duties which neither we nor our fathers have been able to bear; and I am glad to see from a paragraph in the "British Medical Journal" that our *confrères* on the other side of the Silver Streak are taking the same view of it. "The Paris Society of Practical "Medicine and a local medical society have addressed a petition to "the Senate on the subject, in which they state that the notification "of cases of infectious disease, besides being a violation of the *secret* "*médical*, is useless and impossible for medical practitioners to carry "out, and they argue that the duty should devolve on sanitary officials "appointed for the purpose." (*Vide* "British Medical Journal," July 11, 1891, p. 83.)

TABLES

SETTING FORTH THE FACTS UPON WHICH THE FOREGOING PAPER IS BASED.

The following Tables give the death-rates, general and zymotic, of the large towns of England for the twenty years 1871–90. They are constructed from the annual summaries of the Registrar-General so far as the number of deaths from the several causes is concerned; but the populations from which the death-rates are derived are not those estimated and given in the several summaries, which have proved in many instances very fallacious, but consist of two geometric series, 1871–81, 1881–91, formed by reference to the enumerated populations of the terminal and intermediate censuses of the period, after the manner adopted by the Registrar-General for correction of death-rates after every census. The statistics are thus placed on an impregnable basis. The group-averages are in every case obtained by comparing the total number of deaths from the particular disease, in the given year, *in all the towns of the group*, with the corresponding total population divided by 1,000. The group-averages of the twenty large towns have been carried through the whole period, and supplementary averages have been provided, from 1882 onwards, for the groups affected by the eight additional towns, of which the Registrar-General then gave the full data for the first time. Moreover, in Group I., averages are given for the provincial towns by themselves, as well as for the group as a whole, including London, the better to compare with the other groups, which consist of provincial towns only.

The tables will prove useful for reference in all cases in which zymotic death-rates for the given period are in question, because they include the non-notifiable as well as the notifiable zymotic diseases, and give the special death-rates for each in every one of the large towns throughout the period, so far as the Registrar-General has supplied the requisite data.

The following is a list of the tables:—

I. DEATH RATES.—GENERAL (from all Causes).
II. Do. TOTAL ZYMOTIC.
III. Do. NOTIFIABLE ZYMOTIC.
IV. Do. NON-NOTIFIABLE ZYMOTIC.
V. Do. SMALL POX.
VI. Do. SCARLET FEVER.
VII. Do. DIPHTHERIA.
VIII. Do. "FEVER" (chiefly ENTERIC).
IX. Do. MEASLES.
X. Do. WHOOPING COUGH.
XI. Do. DIARRHŒA.
XII. MEAN DEATH RATES for each of the FOUR QUINQUENNIA.
PART I.—GENERAL, TOTAL ZYMOTIC, NOTIFIABLE ZYMOTIC, NON-NOTIFIABLE ZYMOTIC.
PART II.—SMALL POX, SCARLET FEVER, DIPHTHERIA, "FEVER."
PART III.—MEASLES, WHOOPING COUGH, DIARRHŒA.
XIII. CONTRAST between two PERIODS of four years each.
XIV. COMPARISON of DEATH RATES in YEARLY-DESCENDING QUINQUENNIA.
XV. PROPORTION of ZYMOTIC to TOTAL DEATHS in four QUINQUENNIA.
XVI. PROPORTION of ZYMOTIC to TOTAL DEATHS in two periods of four years each.
XVII. UNCERTIFIED DEATHS.

Table I.—DEATH RATES.—GENERAL.

Table giving for the large Towns of England the Death Rates from All Causes in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns** - 37·67	26·36	23·58	24·25	24·83	25·03	23·43	22·60	24·12	23·56	22·61	21·71	22·38	21·86	22·30	20·97	21·46	21·49	19·98	20·06	22·98
GROUP I.																				
(A.) **Towns 1—10** - - 40·86	25·80	22·78	23·68	24·22	24·47	22·86	22·24	23·91	23·36	22·08	21·58	22·02	21·60	21·96	20·53	21·00	20·97	19·61	19·47	22·59
1. London - - - - 50·8	24·7	21·4	22·8	22·5	23·7	22·0	21·6	23·2	23·4	21·9	21·2	21·6	20·6	20·7	20·3	20·5	20·4	19·4	18·3	21·5
(I.) **Nine Provincial towns** - 30·34	27·89	25·23	26·04	27·48	26·30	24·59	23·66	25·69	23·90	23·08	22·25	23·01	23·26	23·50	21·31	21·95	22·24	20·24	21·62	23·97
2. Bristol - - - 46·6	23·2	22·2	23·6	23·2	27·3	23·1	22·5	22·0	22·3	20·9	19·6	19·4	18·1	18·8	20·1	19·9	21·2	17·6	18·5	20·2
3. Wolverhampton - - 22·4	28·0	25·9	25·5	23·9	24·7	24·0	24·4	23·5	23·3	21·2	21·2	22·4	21·3	23·6	20·4	22·4	21·9	20·9	20·8	22·2
4. Birmingham - - 47·9	24·9	23·0	25·3	26·8	26·5	22·7	24·2	25·4	22·6	20·7	19·9	21·1	21·7	22·0	20·1	20·9	20·7	18·9	20·0	22·4
5. Liverpool - - - - 106·3	35·1	27·1	26·3	32·0	27·5	27·6	26·4	29·0	27·2	26·9	26·6	27·0	27·8	26·7	25·7	26·2	26·6	23·1	25·1	27·9
6. Sheffield - - - - 14·5	28·3	26·3	26·7	27·6	25·8	25·5	23·1	26·6	23·3	22·9	21·0	21·7	23·1	22·6	21·1	20·2	22·2	21·1	21·5	25·9
7. Hull - - - - 42·7	23·2	26·1	24·2	25·5	27·1	22·7	21·5	24·1	22·4	23·4	23·8	23·2	22·6	20·9	17·0	18·6	18·8	16·1	19·9	18·8
8. Plymouth - - - - 53·0	24·0	22·3	19·3	22·6	20·9	22·3	21·8	25·8	23·3	25·0	19·8	21·0	20·7	20·6	21·6	22·8	21·8	21·4	23·9	21·3
9. Brighton - - - - 45·9	22·5	20·9	18·7	20·0	22·1	19·8	18·9	21·3	19·4	19·7	19·0	21·9	19·6	18·5	17·6	17·8	17·7	17·1	16·2	19·2
10. Leeds - - - - 14·4	26·4	28·2	28·3	29·3	26·9	25·9	22·9	24·8	23·8	22·1	21·5	23·2	23·3	24·2	19·9	21·9	21·1	20·6	22·1	22·6
11. Cardiff - - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	19·6	19·4	22·9	23·6	20·3	19·5	17·8	16·6	17·5
(K.) **Ten Provincial towns** 29·45	..	..	..	..	..	..	..	..	..	..	..	22·88	23·13	23·53	21·46	21·95	22·19	20·20	21·46	23·75
(B.) **Group I. as a whole** - 40·04	..	..	..	..	..	..	..	..	..	..	..	21·99	21·56	21·99	20·60	21·02	20·96	19·60	19·45	22·55
GROUP II.																				
(C.) **Group II. as a whole** - 18·66	25·78	25·80	23·64	25·60	26·63	23·37	22·02	22·48	22·50	23·47	20·72	22·59	20·57	22·98	20·21	21·77	21·02	19·26	19·87	21·26
12. Bradford - - - - 25·5	25·5	26·6	25·5	27·8	28·2	25·1	23·1	24·0	23·2	22·9	19·6 |	22·7	19·8	21·7	19·3	21·1	22·1	19·0	21·5	23·1
13. Norwich - - - - 11·8	25·9	26·3	21·9	23·3	24·3	21·7	20·7	24·4	22·1 |	24·1	19·4	20·4	19·4	20·8	19·9	22·6	19·8	19·4	17·7	20·0
14. Nottingham - - - 18·9	26·0	24·7	22·3	23·7	26·1	21·9	21·1	20·1 |	22·1	23·8	22·4	24·1	22·2	24·3	21·3	22·2	20·8	19·5	19·6	19·3
GROUP III.																				
(D.) **Seven towns** - - 37·69	29·42	27·11	27·46	27·66	27·40	26·49	24·76	25·87	25·09	25·04	22·73	24·22	23·85	24·19	23·61	23·56	24·30	22·09	23·06	25·51
15. Sunderland - - - 42·3	36·5	26·5	23·1	23·4	22·6	21·2	22·8	26·1	22·5	24·7	20·8	26·8	24·7	23·6	24·3 |	20·1	21·3	18·8	24·0	23·8
16. Portsmouth - - - - 28·6	19·3	23·1	18·5	20·8	20·1	22·8	18·0	20·0	17·9	19·7	19·6	21·3	18·2 |	18·8	18·9	22·6	18·3	17·5	16·7	17·8
17. Newcastle - - - - 27·1	32·2	26·3	30·7	29·5	26·6	23·3	22·9	24·4	24·8	22·8	21·7	22·6 |	24·8	22·2	24·8	20·9	23·5	18·7	22·7	23·1
18. Salford - - - - - 34·4	30·4	25·2	28·9	28·1	29·6	29·7	22·8	22·9	22·5	22·4	22·7	23·9 |	23·5	24·1	23·2	25·0	25·6	24·9	24·8	27·6
19. Manchester - - - 79·5	31·2	28·9	30·9	31·0	30·8	30·1	28·4	29·1	28·8	26·8	25·4 |	26·7	27·6	26·4	26·5	26·3	28·7	26·1	26·7	30·6
20. Oldham - - - - 24·0	24·9	30·5	25·1	28·2	27·6	27·0	21·8	22·9	19·1	19·9 |	22·8	25·1	22·7	25·5	23·3	24·4	25·9	22·3	22·9	24·0
21. Leicester - - - - 38·5	26·8	27·1	25·3	24·8	27·7	24·3	22·5	21·9	23·4 |	25·0	21·8	20·3	19·8	22·8	20·6	21·3	20·9	19·8	18·4	19·7
22. Bolton - - - - 36·5	..	..	..	..	..	..	..	..	..	..	..	23·0	21·7	24·1	21·0	23·3	21·5	21·8	22·2	26·1
23. Blackburn - - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	25·4	24·7	24·3	22·2	26·0	26·3	24·6	26·3	24·4
24. Derby - - - - 22·9	..	..	..	..	..	..	..	..	.. |	..	..	18·9	18·5	19·0	18·8	19·1	18·1	17·3	17·5	20·0
25. Preston - - - - 25·2	..	..	..	..	..	..	..	..	..	..	..	27·6	25·5	27·0	26·8	28·6	27·6	23·7	29·7	27·1
26. Huddersfield - - - 8·2	..	..	..	..	..	..	..	..	..	.. |	..	22·3	21·3	19·6	20·1	19·6	23·0	18·5	18·8	19·0
27. Birkenhead - - - 21·3	..	..	..	..	..	..	..	..	..	..	.. |	20·3	20·3	20·0	20·1	19·9	22·0	18·9	18·9	21·1
28. Halifax - - - - 22·8	..	..	..	..	..	..	..	..	..	..	..	20·4 |	20·0	23·4	19·7	22·8	21·0	19·4	21·6	22·5
(E.) **Seven added towns** - 17·53	..	..	..	..	..	..	..	..	..	..	..	22·72	21·82	23·07	21·32	22·93	22·88	20·77	22·37	23·49
(F.) **Group III. as a whole** 26·95	..	..	..	..	..	..	..	..	..	..	..	23·67	23·13	23·80	22·79	23·34	23·79	21·62	22·82	24·79
(H.) **Twenty-eight towns** 34·34	..	..	..	..	..	..	..	..	..	..	..	22·39	21·84	22·42	21·05	21·56	21·59	20·02	20·22	22·96

Table II.—DEATH RATES.—TOTAL ZYMOTIC.

Table giving for the large Towns of England the Death Rates from Zymotic Diseases as a whole in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.
The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns** - - 37·67	6·462	4·0 4	3·949	4·449	4·304	4·039	3·503	4·384	3·245	4·021	3·355	3·608	2·946	3·643	2·797	2·942	3·345	2·515	2·802	2·959
GROUP I.																				
(A.) **Towns 1–10** - - 40·86	6·347	4·500	3·775	4·348	4·179	3·848	3·538	4·412	3·281	3·813	3·505	3·557	3·024	3·656	2·733	2·877	3·237	2·551	2·661	2·978
1. London - - - - - 50·8	5·95	3·84	3·39	3·30	3·89	3·56	3·45	4·08	3·36	3·69	3·60	3·52	2·77	3·41	2·85	2·77	3·14	2·66	2·85	2·89
(I.) **Nine Provincial towns** - 30·34	7·021	5·668	4·472	6·219	4·751	4·368	3·745	5·081	3·243	4·139	3·317	3·647	3·473	4·001	2·564	3·067	3·437	2·394	3·226	3·047
2. Bristol - - - - 46·6	3·52	3·66	2·75	2·18	5·04	3·84	3·52	2·19	2·26	3·21	2·28	2·39	1·24	1·88	2·36	2·23	3·13	1·33	2·24	2·14
3. Wolverhampton - - 22·4	7·56	6·31	4·89	3·86	3·29	3·92	4·70	3·72	2·14	2·08	2·19	3·28	1·63	3·86	1·96	3·89	2·54	2·40	2·34	1·89
4. Birmingham - - - 47·9	5·40	5·48	5·75	7·35	5·75	3·57	4·11	6·26	3·23	3·32	2·71	3·51	3·17	4·00	2·12	3·27	3·21	2·08	2·87	3·00
5. Liverpool - - - 106·3	11·36	5·71	3·98	8·35	4·51	5·61	4·73	6·04	4·04	5·02	4·47	4·50	4·67	4·76	3·90	3·45	4·41	2·86	3·90	4·14
6. Sheffield - - - 14·5	7·66	7·03	5·07	6·18	4·99	4·97	3·52	5·94	3·80	4·54	2·74	2·87	4·02	4·21	2·76	2·94	4·37	3·70	3·36	3·57
7. Hull - - - - 42·7	4·26	6·50	3·90	5·27	6·13	3·51	2·93	4·13	2·34	5·47	6·11	4·98	3·17	3·51	1·22	2·36	2·78	1·13	3·00	1·89
8. Plymouth - - - 53·0	5·70	5·70	2·32	4·81	2·40	3·08	2·98	5·56	2·25	6·47	1·50	2·12	2·08	1·95	2·28	2·90	2·17	1·71	5·47	2·59
9. Brighton - - - - 45·9	3·98	3·45	1·86	2·54	2·46	2·23	1·96	2·37	1·55	2·79	2·17	4·24	2·35	1·77	1·43	1·98	2·32	1·43	1·64	2·57
10. Leeds - - - - 14·4	5·41	6·30	6·02	6·44	4·65	4·63	2·88	4·70	3·54	3·44	2·92	3·51	4·05	4·87	2·20	3·43	2·69	2·70	3·36	2·39
11. Cardiff - - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	3·20	2·43	4·51	4·58	2·80	2·24	2·58	1·77	2·02
(K.) **Ten Provincial towns** 29·45	..	..	..	..	..	..	..	..	..	..	..	3·630	3·436	4·033	2·660	3·066	3·390	2·414	3·166	3·009
(B.) **Group I. as a whole** - 40·04	..	..	..	..	..	..	..	..	..	..	..	3·553	3·014	3·671	2·766	2·878	3·222	2·555	2·649	2·965
GROUP II.																				
(C.) **Group II. as a whole** - 18·66	5·305	5·651	2·922	4·044	5·133	3·490	2·405	3·271	2·539	4·539	2·744	3·700	1·729	3·334	2·109	2·940	3·101	2·051	2·682	2·379
12. Bradford - - - 25·5	4·57	5·11	3·38	5·62	5·78	3·92	2·56	3·68	2·65	4·00	1·97 |	3·56	1·59	2·62	1·74	2·38	3·17	1·76	3·09	2·57
13. Norwich - - - - 11·8	6·44	7·50	2·17	2·03	4·23	2·87	2·83	3·53	2·23 |	5·72	1·68	2·44	1·00	3·04	2·05	3·42	3·60	2·04	1·85	2·89
14. Nottingham - - - 18·9	5·50	4·92	2·85	3·16	4·78	3·32	1·77	2·71 |	2·59	4·50	3·98	4·52	2·23	4·04	2·52	3·29	2·83	2·35	2·70	1·85
GROUP III.																				
(D.) **Seven towns** - - 37·69	7·42	6·136	5·195	5·076	4·668	5·227	3·695	4·682	3·350	4·905	2·807	3·840	3·042	3·713	3·413	3·273	3·983	2·524	3·549	3·096
15. Sunderland - - - 42·3	15·53	5·24	3·33	4·47	3·85	4·12	3·30	6·44	3·55	6·25	2·73	5·81	2·53	3·53	5·40 |	2·65	3·22	1·40	3·81	2·61
16. Portsmouth - - - 28·6	3·21	7·23	2·68	3·72	3·14	6·66	2·82	3·19	1·21	2·84	3·41	4·39	2·19 |	2·89	2·24	4·82	2·29	1·52	1·92	1·67
17. Newcastle - - - - 27·1	9·32	4·50	7·05	5·54	3·64	2·59	2·51	4·70	4·08	3·32	2·62	3·26 |	4·19	3·10	4·21	2·35	3·14	1·32	2·74	1·78
18. Salford - - - - 34·4	8·10	5·05	5·87	6·18	6·81	7·88	4·37	4·60	3·56	5·87	2·93	4·01 |	3·50	4·59	3·76	4·30	5·12	4·17	5·53	4·72
19. Manchester - - - 79·5	6·85	5·80	6·07	5·59	4·69	5·39	4·35	4·18	3·69	4·47	2·32 |	3·78	3·56	3·59	3·07	3·06	4·86	3·14	4·02	4·01
20. Oldham - - - - 24·0	3·77	9·40	3·33	4·40	3·86	3·77	2·66	4·91	2·25	3·42 |	2·28	2·86	1·55	3·59	2·09	2·93	4·39	2·10	3·25	2·29
21. Leicester - - - - 38·5	5·91	7·82	5·15	3·98	6·40	5·15	3·13	4·06	2·76 |	6·11	4·15	3·05	2·41	4·15	3 50	2·94	3·30	2·67	3·54	2·35
22. Bolton - - - - 36·5	..	..	..	..	..	..	.. |	..	..	..	..	4·47	2·23	4·32	1·96	3·80	3·24	2·79	4·17	3·77
23. Blackburn - - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	4·51	2·84	4·04	2·64	4·36	4·50	4·25	4·88	2·22
24. Derby - - - - 22·9	..	..	..	..	..	..	..	..	.. |	..	..	2·28	1·58	2·33	1·56	1·85	2·56	1·90	1·62	2·91
25. Preston - - - - 25·2	..	..	..	..	..	..	..	..	..	.. |	..	5·51	4·27	5·11	4·16	5·59	4·45	3·03	7·62	4·24
26. Huddersfield - - - 8·2	..	..	..	..	..	..	..	..	..	..	.. |	2·79	1·66	1·75	1·42	1·62	3·34	1·51	2·02	1·19
27. Birkenhead - - - 21·3	..	..	..	..	..	..	..	..	..	..	..	2·89	1·87	2·25	2·53	2·42	3·35	1·66	2·96	2·88
28. Halifax - - - - 22·8	..	..	..	..	..	..	..	..	..	..	..	1·68 |	1·04	2·42	1·12	2·40	1·25	1·18	1·67	1·37
(E.) **Seven added towns** - 17·53	..	..	..	..	..	..	..	..	..	..	..	3·578	2·285	3·356	2·258	3·259	3·327	2·435	3·723	2·767
(F.) **Group III. as a whole** 26·95	..	..	..	..	..	..	..	..	..	..	..	3·745	2·773	3·587	3·001	3·268	3·751	2·492	3·610	2·979
(H.) **Twenty-eight towns** - 34·34	..	..	..	..	..	..	..	..	..	..	..	3·604	2·892	3·633	2·780	2·966	3·332	2·511	2·861	2·934

TABLE III.—DEATH RATES.—NOTIFIABLE ZYMOTIC.

TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from NOTIFIABLE ZYMOTIC DISEASES in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) Twenty towns - 37·67	3·622	2·037	1·336	2·055	1·787	1·580	1·475	1·624	1·346	1·321	1·443	1·187	1·171	1·096	0·771	0·666	0·835	0·779	0·794	0·809
GROUP I.																				
(A.) Towns 1—10 - - 40·86	3·604	1·771	1·197	2·087	1·739	1·417	1·502	1·652	1·312	1·248	1·502	1·193	1·234	1·140	0·761	0·634	0·821	0·780	0·777	0·775
1. London - - - 50·8	3·62	1·29	0·78	1·36	1·61	1·30	1·59	1·42	1·33	1·35	1·65	1·15	1·06	1·09	0·80	0·57	0·76	0·79	0·72	0·70
(I.) Nine Provincial towns - 30·34	3·572	2·606	1·928	3·369	1·990	1·638	1·361	2·090	1·318	1·122	1·231	1·283	1·532	1·190	0·688	0·761	0·927	0·760	0·885	0·895
2. Bristol - - - 46·6	1·91	1·79	0·93	0·78	3·29	2·09	0·96	0·67	0·66	1·42	1·09	0·64	0·42	0·50	0·38	0·73	1·30	0·55	0·37	0·40
3. Wolverhampton - - 22·4	5·34	4·13	3·08	1·23	0·96	1·33	3·39	0·97	0·40	0·84	0·95	0·54	0·63	0·73	0·80	0·45	0·51	0·48	0·33	0·35
4. Birmingham - - 47·9	1·30	2·78	2·85	4·57	1·90	1·07	1·16	3·19	1·21	0·65	0·70	1·00	1·38	0·76	0·40	0·42	0·40	0·33	0·61	0·75
5. Liverpool - - 106·3	7·08	1·56	1·16	4·75	1·94	2·02	1·80	2·59	1·96	1·43	1·46	1·88	1·86	1·08	1·04	1·18	1·15	0·79	1·18	1·55
6. Sheffield - - 14·5	4·01	4·28	1·95	3·48	2·51	2·09	1·55	3·26	1·68	1·72	0·53	1·00	2·00	1·97	0·64	0·66	1·90	2·09	1·11	1·21
7. Hull - - - 42·7	1·87	3·38	1·49	2·82	2·93	1·04	0·72	0·84	0·99	0·75	4·93	2·29	0·95	0·90	0·53	0·42	0·55	0·50	0·37	0·39
8. Plymouth - - 53·0	2·06	4·14	0·64	0·78	0·73	0·76	1·46	1·35	0·84	0·65	0·43	0·42	0·47	0·49	0·53	0·92	0·45	0·42	3·97	0·83
9. Brighton - - - 45·9	2·08	1·24	0·44	0·59	0·54	0·87	0·63	0·29	0·28	0·98	1·22	1·22	0·40	0·56	0·40	0·43	0·47	0·43	0·42	0·33
10. Leeds - - - 14·4	1·94	2·72	3·60	3·41	1·48	1·84	0·97	1·33	1·28	0·86	0·64	1·22	2·64	2·10	0·93	0·94	0·66	0·54	0·72	0·64
11. Cardiff - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	1·35	1·06	2·00	0·98	0·91	0·51	0·67	0·39	0·40
(K.) Ten Provincial towns 29·45	..	..	..	..	..	..	..	..	..	..	..	1·286	1·514	1·229	0·703	0·770	0·909	0·759	0·863	0·872
(B.) Group I. as a whole - 40·04	..	..	..	..	..	..	..	..	..	..	..	1·196	1·230	1·154	0·766	0·639	0·816	0·778	0·771	0·769
GROUP II.																				
(C.) Group II. as a whole - 18·66	2·933	2·910	1·056	1·838	2·537	1·297	1·027	1·016	1·223	1·543	1·453	1·189	0·592	0·601	0·660	0·576	0·644	0·567	0·545	0·495
12. Bradford - - 25·5	2·05	1·74	1·30	2·88	3·41	1·43	1·10	1·43	1·38	1·46	0·86|	0·62	0·59	0·49	0·53	0·66	0·73	0·30	0·59	0·40
13. Norwich - - - 11·8	4·22	4·84	0·84	0·53	0·97	1·18	1·48	0·56	0·80|	2·67	0·94	0·19	0·20	0·51	1·17	0·67	0·79	0·65	0·43	0·62
14. Nottingham - - - 18·9	3·25	3·14	0·85	1·23	2·39	1·18	0·51	0·81|	1·27	1·08	2·26	2·23	0·88	0·74	0·55	0·44	0·50	0·79	0·54	0·52
GROUP III.																				
(D.) Seven towns - - 37·69	3·922	3·147	2·150	1·946	1·788	2·526	1·490	1·716	1·580	1·622	1·132	1·153	1·077	1·070	0·870	0·865	0·986	0·857	0·976	1·103
15. Sunderland - - 42·3	12·91	2·81	0·96	2·10	1·08	1·88	1·96	2·27	2·53	3·08	1·54	2·29	1·52	1·42	1·38|	0·48	0·47	0·51	0·76	1·00
16. Portsmouth - - 28·6	1·36	5·71	1·47	1·41	1·39	4·36	1·07	0·90	0·65	0·82	2·27	2·01	1·05|	0·81	1·00	1·43	0·88	0·59	0·52	0·73
17. Newcastle - - - 27·1	6·57	2·56	4·48	2·89	1·33	0·99	0·90	2·33	2·40	1·22	0·88	1·40|	1·76	1·49	1·10	0·59	0·74	0·50	0·49	0·61
18. Salford - - 34·4	3·06	1·65	1·69	2·13	2·92	4·10	1·87	1·70	1·43	1·97	0·95	0·95|	0·98	1·35	0·77	1·29	1·37	1·33	2·34	2·04
19. Manchester - - - 79·5	2·58	2·00	2·46	2·10	1·71	2·31	1·78	1·52	1·35	1·30	0·56|	0·75	1·04	0·97	0·56	0·86	1·18	1·18	1·13	1·44
20. Oldham - - - 24·0	1·58	7·03	1·84	1·43	1·79	1·97	1·05	2·50	1·39	1·20|	1·28	0·84	0·50	0·52	0·48	0·71	1·50	1·07	0·69	0·36
21. Leicester - - 38·5	2·14	3·98	0·85	0·84	2·31	2·05	0·61	0·39	1·02|	1·39	1·58	0·63	0·66	0·71	1·30	0·50	0·40	0·41	0·31	0·54
22. Bolton - - - 36·5	..	..	..	..	..	..	.. |	..	..	..	..	0·75	0·40	0·50	0·32	0·35	0·71	0·89	1·13	0·89
23. Blackburn - - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	0·95	1·38	1·09	0·48	0·65	1·79	1·97	1·33	0·62
24. Derby - - - 22·9	..	..	..	..	..	..	..	..	.. |	..	..	1·20	0·45	0·73	0·25	0·46	0·31	0·74	0·61	0·51
25. Preston - - 25·2	..	..	..	..	..	..	..	..	..	.. |	..	0·94	1·36	1·34	1·21	0·84	1·51	1·22	1·07	0·64
26. Huddersfield - - 8·2	..	..	..	..	..	..	..	..	..	.. |	..	0·55	0·30	0·26	0·27	0·61	0·87	0·57	0·51	0·38
27. Birkenhead - - 21·3	..	..	..	..	..	..	..	..	..	..	.. |	0·78	0·61	0·78	0·65	0·82	1·31	0·82	0·58	0·72
28. Halifax - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·73|	0·58	0·76	0·69	0·52	0·64	0·41	0·50	0·63
(E.) Seven added towns - 17·53	..	..	..	..	..	..	..	..	..	..	..	0·843	0·751	0·803	0·556	0·608	1·052	0·992	0·853	0·648
(F.) Group III. as a whole 26·95	..	..	..	..	..	..	..	..	..	..	..	1·042	0·962	0·976	0·757	0·775	1·009	0·905	0·933	0·944
(H.) Twenty-eight towns 34·34	..	..	..	..	..	..	..	..	..	..	..	1·163	1·138	1·084	0·758	0·665	0·849	0·794	0·793	0·791

Table IV.—DEATH RATES.—NON-NOTIFIABLE ZYMOTIC.

Table giving for the large Towns of England the Death Rates from Non-Notifiable Zymotic Diseases in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns - - 37·67**	2·840	2·767	2·614	2·394	2·516	2·459	2·028	2·761	1·899	2·699	1·911	2·422	1·776	2·548	2·026	2·276	2·510	1·737	2·008	2·150
GROUP I.																				
(A.) **Towns 1—10 - - 40·86**	2·742	2·729	2·579	2·261	2·441	2·431	2·037	2·761	1·969	2·564	2·003	2·364	1·790	2·516	1·971	2·242	2·416	1·771	1·884	2·203
1. London - - - - - 50·8	2·34	2·55	2·62	1·94	2·28	2·27	1·85	2·66	2·02	2·35	1·95	2·37	1·71	2·32	2·05	2·20	2·38	1·87	1·64	2·19
(I.) **Nine Provincial towns - 30·34**	3·449	3·061	2·545	2·850	2·761	2·731	2·384	2·992	1·925	3·017	2·085	2·363	1·942	2·811	1·876	2·307	2·510	1·634	2·341	2·153
2. Bristol - - - 46·6	1·59	1·87	1·82	1·42	1·74	1·75	2·56	1·52	1·59	1·79	1·19	1·76	0·82	1·38	1·98	1·50	1·83	0·78	1·87	1·74
3. Wolverhampton - 22·4	2·22	2·18	1·81	2·64	2·32	2·58	1·30	2·75	1·74	2·14	1·24	2·74	1·00	3·13	1·16	3·43	2·03	1·92	2·01	1·54
4. Birmingham - - 47·9	4·10	2·70	2·90	2·77	3·85	2·50	2·94	3·06	2·02	2·67	2·01	2·51	1·80	3·23	1·72	2·85	2·81	1·75	2·26	2·26
5. Liverpool - - 106·3	4·28	4·15	2·82	3·60	2·57	3·59	2·92	3·44	2·08	3·59	3·01	2·62	2·81	3·68	2·86	2·28	3·26	2·07	2·72	2·60
6. Sheffield - - - 14·5	3·65	2·76	3·12	2·69	2·49	2·88	1·97	2·66	2·12	2·81	2·21	1·87	2·02	2·24	2·12	2·27	2·47	1·61	2·25	2·36
7. Hull - - - 42·7	2·39	3·12	2·42	2·45	3·19	2·47	2·22	3·29	1·35	4·72	1·18	2·69	2·22	2·61	0·68	1·94	2·23	0·63	2·63	1·41
8. Plymouth - - - 53·0	3·64	1·56	1·70	4·03	1·68	2·32	1·52	4·21	1·42	5·81	1·07	1·70	1·61	1·46	1·75	1·98	1·72	1·29	1·50	1·77
9. Brighton - - - 45·9	1·90	2·21	1·42	1·95	1·92	1·35	1·33	2·08	1·26	1·81	0·95	3·02	1·95	1·22	1·03	1·55	1·85	1·00	1·22	2·24
10. Leeds - - - 14·4	3·47	3·59	2·42	3·03	3·16	2·79	1·92	3·37	2·27	2·59	2·28	2·29	1·41	2·77	1·27	2·49	2·03	2·16	2·64	1·75
11. Cardiff - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	1·85	1·37	2·51	3·61	1·89	1·74	1·91	1·38	1·61
(K.) **Ten Provincial towns 29·45**	..	..	..	..	..	..	..	..	..	..	..	2·344	1·922	2·804	1·957	2·296	2·481	1·655	2·302	2·136
(B.) **Group I. as a whole - 40·04**	..	..	..	..	..	..	..	..	..	..	..	2·358	1·783	2·518	2·000	2·239	2·406	1·776	1·877	2·196
GROUP II.																				
(C.) **Group II. as a whole - 18·66**	2·372	2·741	1·866	2·206	2·596	2·193	1·379	2·255	1·316	2·996	1·292	2·510	1·137	2·733	1·449	2·364	2·45	1·484	2·136	1·884
12. Bradford - - - 25·5	2·53	3·37	2·08	2·74	2·37	2·48	1·45	2·25	1·25	2·54	1·11 |	2·94	1·09	2·14	1·21	1·72	2·44	1·46	2·50	2·17
13. Norwich - - - 11·8	2·22	2·66	1·32	1·49	3·27	1·69	1·35	2·97	1·43 |	3·06	0·74	2·25	0·80	2·53	0·88	2·75	2·81	1·39	1·42	2·27
14. Nottingham - - 18·9	2·26	1·78	2·00	1·92	2·39	2·14	1·27	1·90 |	1·32	3·42	1·72	2·28	1·34	3·30	1·97	2·86	2·33	1·56	2·16	1·33
GROUP III.																				
(D.) **Seven towns - - 37·69**	3·501	2·989	3·045	3·130	2·880	2·701	2·205	2·965	1·769	3·283	1·675	2·687	1·966	2·642	2·544	2·408	2·997	1·667	2·573	1·992
15. Sunderland - - 42·3	2·62	2·42	2·38	2·36	2·77	2·24	1·34	4·18	1·01	3·17	1·19	3·51	1·01	2·11	4·02 |	2·16	2·75	0·89	3·06	1·62
16. Portsmouth - - 28·6	1·85	1·53	1·20	2·31	1·75	2·30	1·75	2·30	0·55	2·02	1·14	2·38	1·14 |	2·08	1·25	3·38	1·41	1·13	1·40	0·94
17. Newcastle - - 27·1	2·75	1·93	2·57	2·66	2·30	1·69	1·61	2·37	1·08	2·10	1·73	1·86 |	2·43	1·61	3·11	1·76	2·42	0·82	2·25	1·17
18. Salford - - - 34·4	5·04	3·39	4·18	4·05	3·90	3·79	2·50	2·90	2·14	3·90	1·98	3·08 |	2·52	3·24	2·99	3·01	3·75	2·84	3·20	2·68
19. Manchester - - 79·5	4·27	3·80	3·60	3·49	2·98	3·07	2·56	2·66	2·34	3·17	1·76 |	3·03	2·52	2·62	2·51	2·20	3·68	1·96	2·89	2·57
20. Oldham - - 24·0	2·19	2·37	1·49	2·97	2·07	1·79	1·62	2·41	0·86	2·22 |	1·01	2·01	1·05	3·07	1·61	2·22	2·89	1·03	2·55	1·93
21. Leicester - - 38·5	3·77	3·84	4·30	3·13	4·10	3·11	2·52	3·67	1·74 |	4·73	2·57	2·42	1·74	3·44	2·19	2·44	2·90	2·26	2·23	1·82
22. Bolton - - - 36·5	..	..	..	..	..	..	.. |	..	..	..	..	3·72	1·83	3·82	1·64	3·44	2·54	1·90	3·04	2·88
23. Blackburn - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	3·57	1·45	2·95	2·16	3·70	2·71	2·29	3·55	1·59
24. Derby - - - 22·9	..	..	..	..	..	..	..	..	.. |	..	..	1·08	1·13	1·69	1·31	1·39	2·25	1·16	1·01	2·40
25. Preston - - 25·2	..	..	..	..	..	..	..	..	..	.. |	..	4·57	2·21	3·77	2·95	4·75	2·94	1·81	6·55	3·59
26. Huddersfield - - 8·2	..	..	..	..	..	..	..	..	..	.. |	..	2·24	1·36	1·49	1·15	1·01	2·47	0·94	1·51	0·81
27. Birkenhead - - 21·3	..	..	..	..	..	..	..	..	..	..	.. |	2·11	1·25	1·47	1·88	1·60	2·04	0·85	2·37	2·16
28. Halifax - - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·95 |	0·46	1·66	0·43	1·88	0·61	0·77	1·17	0·74
(E.) **Seven added towns - 17·53**	..	..	..	..	..	..	..	..	..	..	..	2·735	1·533	2·552	1·702	2·651	2·274	1·443	2·869	2·119
(F.) **Group III. as a whole 26·95**	..	..	..	..	..	..	..	..	..	..	..	2·703	1·811	2·611	2·243	2·493	2·743	1·588	2·677	2 ·35
(H.) **Twenty-eight towns 34·34**	..	..	..	..	..	..	..	..	..	..	..	2·441	1·754	2·549	2·021	2·301	2·483	1·718	2·067	2·142

TABLE V.—DEATH RATES.—SMALL POX.

TABLE giving for the LARGE TOWNS OF ENGLAND the DEATH RATES from SMALL POX in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns - - 37·67**	2·068	0·842	0·076	0·129	0·062	0·243	0·430	0·198	0·062	0·065	0·325	0·085	0·053	0·159	0·132	0·008	0·039	0·065	0·001	0·001
GROUP I.																				
(A.) **Towns 1—10 - - 40·86**	2·102	0·730	0·076	0·148	0·068	0·207	0·508	0·249	0·079	0·081	0·405	0·085	0·049	0·185	0·159	0·009	0·048	0·076	0·000	0·001
1. London - - - - - 50·8	2·40	0·54	0·03	0·02	0·02	0·21	0·71	0·40	0·13	0·13	0·62	0·11	0·03	0·22	0·23	0·01	0·00	0·00	0·00	0·00
(I.) **Nine Provincial towns - 30·34**	1·564	1·067	0·149	0·376	0·149	0·206	0·158	0·005	0·000	0·003	0·026	0·037	0·074	0·103	0·039	0·017	0·131	0·206	0·001	0·002
2. Bristol - - - - 46·6	0·24	1·13	0·05	0·13	0·37	0·12	—	—	—	0·01	—	0·00	0·00	0·00	0·05	0·03	0·06	0·12	—	—
3. Wolverhampton - - - 22·4	4·15	2·60	0·03	0·01	—	—	—	—	—	—	—	0·05	0·09	0·06	0·00	—	—	—	—	—
4. Birmingham - - - 47·9	0·18	0·85	0·34	1·77	0·48	—	0·02	0·01	0·00	0·01	0·01	0·04	0·28	0·15	0·03	—	0·00	—	—	—
5. Liverpool - - - - 100·3	3·86	0·10	0·02	0·06	0·06	0·74	0·57	0·01	—	0·00	0·06	0·01	0·05	0·19	0·09	0·06	0·00	0·00	0·00	—
6. Sheffield - - - - - 14·5	1·68	2·45	0·02	0·00	—	0·00	0·01	0·00	—	0·00	—	0·01	0·01	0·11	0·03	—	0·91	1·31	—	—
7. Hull - - - - - 42·7	0·47	1·73	0·20	0·02	0·01	—	0·01	0·01	—	—	0·03	0·09	0·04	0·10	0·05	—	0·01	0·09	—	0·01
8. Plymouth - - - - - 53·0	0·85	3·02	0·03	0·03	0·01	—	0·01	—	—	—	0·03	0·00	0·00	0·00	0·00	—	—	—	—	0·01
9. Brighton - - - - - 45·9	0·71	0·04	—	0·01	—	0·01	0·10	—	—	—	0·08	0·04	0·00	0·01	0·01	—	—	—	—	—
10. Leeds - - - - - 14·4	0·16	1·01	0·41	0·12	0·07	0·01	0·01	—	—	—	0·01	0·10	0·03	0·00	0·01	0·00	0·00	0·05	0·00	—
11. Cardiff - - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	0·01	0·01	0·08	0·02	0·01	0·10	0·03	—	—
(K.) **Ten Provincial Towns 29·45**	..	..	..	..	..	..	..	..	..	..	..	0·036	0·071	0·102	0·038	0·016	0·129	0·198	0·001	0·002
(B.) **Group I. as a whole - 40·04**	..	..	..	..	..	..	..	..	..	..	..	0·084	0·048	0·184	0·156	0·009	0·049	0·074	0·000	0·001
GROUP II.																				
(C.) **Group II. as a whole - 18·66**	1·251	1·712	0·066	0·178	0·009	0·009	0·011	0·007	0·002	0·002	0·015	0·114	0·004	0·000	0·009	0·004	—	0·027	0·002	—
12. Bradford - - - - 25·5	0·03	0·21	0·13	0·38	0·02	0·01	0·02	0·01	—	0·01	0·01 |	0·01	0·00	0·00	0·01	—	—	0·01	0·00	—	—
13. Norwich - - - - 11·8	3·04	3·91	0·01	—	—	0·02	—	0·02	— |	—	0·01	0·00	0·00	0·00	0·00	—	—	—	—	—
14. Nottingham - - - - 18·9	1·64	2·25	—	—	—	—	—	— |	0·01	—	0·02	0·27	0·01	0·00	0·01	0·01	—	0·06	—	—
GROUP III.																				
(D.) **Seven towns - - 37·69**	2·146	1·140	0·078	0·016	0·049	0·512	0·156	0·003	0·001	0·002	0·024	0·073	0·097	0·086	0·045	0·002	0·008	0·029	0·002	—
15. Sunderland - - - - 42·3	8·60	0·54	0·01	—	—	—	—	0·01	—	—	—	0·01	0·41	0·69	0·14 |	—	—	0·01	—	—
16. Portsmouth - - - - 28·6	0·34	4·44	0·41	0·02	—	0·01	0·01	—	—	—	—	0·00	0·01 |	0·00	0·00	0·01	0·02	—	0·01	—	—
17. Newcastle - - - - 27·1	5·40	1·03	0·03	—	—	0·01	0·01	—	—	—	0·06	0·38 |	0·39	0·08	0·02	—	0·01	—	—	—
18. Salford - - - - - 34·4	1·81	0·31	0·03	0·03	0·23	2·32	0·52	0·01	—	—	0·04	0·03 |	0·00	0·00	0·00	—	—	—	—	—
19. Manchester - - - - 79·5	0·76	0·21	0·06	0·03	0·05	0·55	0·15	0·00	0·00	0·01	0·01 |	0·05	0·00	0·01	0·10	0·00	0·01	0·06	0·00	—
20. Oldham - - - - - 24·0	0·63	0·30	0·01	0·01	0·03	0·07	0·21	0·01	—	— |	0·08	0·04	0·02	0·00	0·00	—	—	0·11	—	—
21. Leicester - - - - 38·5	0·11	3·19	0·02	—	—	—	0·01	—	— |	—	—	0·00	0·00	0·00	0·00	—	—	—	—
22. Bolton - - - - 36·5	..	..	..	..	..	..	..	.. |	..	..	..	0·18	0·00	0·00	0·01	—	—	0·01	—	—	—
23. Blackburn - - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	0·00	0·00	0·00	0·00	0·02	0·03	0·09	—	—	—
24. Derby - - - - 22·9	..	..	..	..	..	..	..	..	.. |	..	..	0·02	0·01	0·02	0·00	—	—	0·01	—	0·01	—
25. Preston - - - - 25·2	..	..	..	..	..	..	..	..	..	.. |	..	0·02	0·00	0·00	0·01	—	0·01	0·50	—	—	—
26. Huddersfield - - 8·2	..	..	..	..	..	..	..	..	..	.. |	..	0·00	0·00	0·00	0·00	—	—	0·02	—	0·01	—
27. Birkenhead - - - 21·3	..	..	..	..	..	..	..	..	..	..	.. |	0·00	0·00	0·12	0·02	0·02	—	—	—	—	—
28. Halifax - - - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·01 |	0·00	0·00	0·01	—	—	0·01	—	—	—
(E.) **Seven added towns - 17·53**	..	..	..	..	..	..	..	..	..	..	..	0·038	0·002	0·020	0·007	0·006	0·007	0·099	—	0·003
(F.) **Group III. as a whole 26·95**	..	..	..	..	..	..	..	..	..	..	..	0·060	0·062	0·063	0·031	0·003	0·008	0·053	0·001	0·001
(H.) **Twenty-eight towns 34·34**	..	..	..	..	..	..	..	..	..	..	..	0·080	0·049	0·147	0·118	0·008	0·037	0·067	0·001	0·001

Table VI.—DEATH RATES.—SCARLET FEVER.

Table giving for the large Towns of England the Death Rates from Scarlet Fever in each of the Twenty Years 1871-90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns - 37·67**	0·681	0·514	0·583	1·246	1·075	0·793	0·535	0·866	0·855	0·836	0·660	0·572	0·601	0·463	0·240	0·263	0·394	0·278	0·308	0·340
GROUP I.																				
(A.) **Towns 1—10 - - 40·86**	0·672	0·398	0·474	1·281	1·047	0·689	0·491	0 846	0·792	0·758	0·642	0·574	0·652	0·466	0·219	0·239	0·386	0·284	0·303	0·333
1. London - - - 50·8	0·58	0·27	0·19	0·78	1·05	0·65	0·45	0·49	0·75	0·83	0·55	0·53	0·52	0·36	0·18	0·18	0·35	0·29	0·19	0·20
(I.) **Nine Provincial towns - 30·34**	0·851	0·616	0·964	2·162	1·043	0·758	0·583	1·470	0·903	0·657	0·802	0·670	0·901	0·643	0·293	0·359	0·439	0·263	0·508	0·554
2. Bristol - - - 46·6	0·94	0·12	0·21	0·11	2·38	1·45	0·23	0·18	0·45	1·16	0·74	0·36	0·16	0·18	0·11	0·41	1·00	0·20	0·13	0·18
3. Wolverhampton - - 22·4	0·34	1·02	1·77	0·48	0·36	0·82	3·09	0·55	0·23	0·56	0·74	0·35	0·30	0·45	0·58	0·08	0·20	0·20	0·69	0·15
4. Birmingham - - 47·9	0·37	1·17	1·65	2·05	0·74	0·55	0·62	2·59	0·80	0·31	0·41	0·63	0·80	0·31	0·07	0·09	0·08	0·10	0·36	0·49
5. Liverpool - 106·3	1·27	0·44	0·42	3·74	0·91	0·48	0·43	1·76	1·37	0·85	0·79	0·69	0·72	0·37	0·36	0·52	0·60	0·35	0·67	1·11
6. Sheffield - - 14·5	1·35	0·77	0·92	2·65	1·22	1·06	0·78	2·68	1·30	0·96	0·27	0·69	1·59	1·52	0·33	0·43	0·67	0·50	0·72	0·83
7. Hull - - - - 42·7	0·53	0·23	0·28	1·40	2·07	0·42	0·22	0·14	0·52	0·41	4·48	1·67	0·44	0·24	0·22	0·25	0·33	0.21	0·06	0·12
8. Plymouth - - - 53·0	0·41	0·15	0·01	0·13	0·20	0·19	0·67	0·51	0·19	0·05	0·05	0·07	0·00	0·03	0·16	0·23	0·17	0·09	3·23	0·34
9. Brighton - - - 45·9	0·91	0·82	0·06	0·03	0·19	0·65	0·27	0·08	0·15	0·75	0·69	0·90	0·10	0·26	0·06	0·12	0·09	0·08	0·15	0·11
10. Leeds - - - - 14·4	0·41	0·56	2·32	2·43	0·83	1·13	0·53	0·86	0·94	0·41	0·25	0·52	2·10	1·46	0·63	0·57	0·33	0·29	0·31	0·28
11. Cardiff - - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	0·87	0·46	1·20	0·24	0·15	0·09	0·26	0·11	0·13
(K.) **Ten Provincial towns 29·45**	..	..	..	..	..	..	..	..	..	..	..	0·677	0·885	0·669	0·291	0·351	0·423	0·264	0·490	0·533
(B.) **Group I. as a whole - 40·04**	..	..	..	..	..	..	..	..	..	..	..	0·578	0·648	0·479	0·219	0·237	0·381	0·283	0·301	0·329
GROUP II.																				
(C.) **Group II. as a whole - 18·66**	0·683	0·322	0·191	1·008	1·903	0·789	0·575	0·558	0·893	1·136	1·167	0·753	0·205	0·154	0·174	0·233	0·311	0·147	0·196	0·164
12. Bradford - - - 25·5	0·98	0·54	0·31	1·81	2·83	0·86	0·63	0·90	1·03	1·06	0·65 |	0·35	0·18	0·17	0·24	0·44	0·49	0·16	0·29	0·21
13. Norwich - - - - 11·8	0·53	0·22	0·06	0·02	0·41	0·70	0·94	0·13	0·38 |	2·16	0·73	0·07	0·03	0·04	0·09	0·15	0·38	0·17	0·06	0·05
14. Nottingham - - - 18·9	0·33	0·06	0·11	0·52	1·60	0·74	0·18	0·42 |	1·02	0·73	1·88	1·48	0·31	0·19	0·15	0·07	0·11	0·12	0·16	0·16
GROUP III.																				
(D.) **Seven towns - - 37·69**	0·728	1·180	1·272	1·132	0·950	1·343	0·755	1·094	1·172	1·127	0·554	0·491	0·499	0.568	0·374	0·396	0·465	0·305	0·379	0·445
15. Sunderland - - - 42·3	1·92	1·13	0·28	1·30	0·57	1·25	1·22	1·67	2·17	2·64	1·22	1·43	0·32	0·38	0·87 |	0·21	0·13	0·16	0·29	0·54
16. Portsmouth - - 28·6	0·26	0·04	0·03	0·30	0·39	3·69	0·32	0·13	0·08	0·06	0·19	0.31	0·13 |	0·07	0·04	0·12	0·18	0.08	0·08	0·12
17. Newcastle - - - - 27·1	0·30	0·83	3·54	1·92	0·56	0·37	0·49	1·59	1·98	0·94	0·34	0·55 |	0·80	0·96	0·47	0·26	0·22	0·14	0·16	0·14
18. Salford - - - - - 34·4	0·48	0·60	0·94	1·11	1·74	1·20	0·66	0·98	1·02	1·30	0·47	0·44 |	0·45	0·75	0·33	0·89	0·83	0·52	0·93	0·60
19. Manchester - - - 79·5	0·74	1·02	1·56	1·42	0·94	0·99	1·06	1·01	0·98	0·95	0·28 |	0·28	0·70	0·67	0·19	0·44	0.65	0·44	0·46	0·74
20. Oldham - - - - - 24·0	0·42	6·12	1·35	0·79	0·73	1·14	0·49	1·98	1·08	0·94 |	0·75	0·50	0·19	0·27	0·17	0·27	0·84	0·53	0·43	0·19
21. Leicester - - - - 38·5	1·17	0·05	0·06	0·23	1·63	1·55	0·29	0·07	0·74 |	0·77	1·23	0·39	0.52	0·47	0·88	0·32	0·04	0·03	0·04	0·24
22. Bolton - - - - 36·5	..	..	..	..	..	..	..	.. |	..	..	..	0·20	0·06	0·14	0·07	0·14	0·33	0·48	0·57	0·49
23. Blackburn - - - 13·2	..	..	.	..	..	..	..	..	..	.. |	..	0·44	0·48	0·40	0·17	0·33	1·40	1·49	1·08	0·26
24. Derby - - - - 22·9	..	..	..	..	..	..	..	..	..	.. |	..	0·77	0·20	0·15	0·11	0·08	—	0·35	0·21	0·11
25. Preston - - - - 25·2	..	..	..	..	..	..	..	..	..	..	..	0·23	0·65	0·81	0·68	0·18	0·62	0·21	0·17	0·23
26. Huddersfield - - - 8·2	..	..	..	..	..	..	..	..	..	..	..	0·25	0·08	0·08	0·13	0·36	0.35	0·27	0·28	0·07
27. Birkenhead - - - 21·3	..	..	..	..	..	..	..	..	..	..	..	0·20	0·26	0·31	0·33	0·44	0·95	0·36	0·14	0·16
28. Halifax - - - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0.31 |	0·13	0·40	0·39	0·12	0·41	0·25	0·10	0·29
(E.) **Seven added towns - 17·53**	..	..	..	..	..	..	..	..	..	..	..	0·336	0.276	0·339	0·267	0·236	0·603	0·521	0·395	0·244
(F.) **Group III. as a whole 26·95**	..	..	..	..	..	..	..	..	..	..	..	0·437	0·419	0·488	0·336	0·340	0·513	0·381	0·385	0·374
(H.) **Twenty-eight towns 34·34**	..	..	..	..	..	..	..	..	..	..	..	0·557	0·575	0·462	0·242	0·260	0·406	0·297	0·313	0·330

Table VII.—DEATH RATES.—DIPHTHERIA.

Table giving for the large Towns of England the Death Rates from Diphtheria in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) Twenty towns - - 37·67	0·104	0·088	0·093	0·106	0·123	0·091	0·090	0·136	0·131	0·116	0·145	0·167	0·173	0·184	0·174	0·169	0·186	0·232	0·283	0·269
GROUP I.																				
(A.) Towns 1—10 - - 40·86	0·109	0·094	0·101	0·111	0·128	0·095	0·091	0·145	0·142	0·123	0·136	0·174	0·192	0·204	0·190	0·185	0·192	0·240	0·290	0·264
1. London - - - - 50·8	0·10	0·08	0·09	0·11	0·16	0·10	0·09	0·16	0·16	0·15	0·17	0·22	0·24	0·24	0·23	0·21	0·24	0·32	0·39	0·34
(I.) Nine Provincial towns - 30·34	0·131	0·122	0·118	0·120	0·078	0·082	0·097	0·130	0·110	0·087	0·074	0·089	0·101	0·126	0·127	0·139	0·113	0·101	0·122	0·130
2. Bristol - - - 46·6	0·10	0·09	0·11	0·07	0·07	0·06	0·02	0·04	0·02	0·06	0·06	0·04	0·09	0·09	0·11	0·14	0·11	0·09	0·07	0·06
3. Wolverhampton - - 22·4	0·06	0·04	0·10	0·08	0·08	0·17	0·03	0·07	0·05	0·07	0·05	0·01	0·05	0·06	0·11	0·18	0·09	0·12	0·09	0·06
4. Birmingham - - - 47·9	0·22	0·23	0·28	0·20	0·15	0·14	0·14	0·21	0·19	0·14	0·14	0·14	0·12	0·10	0·11	0·18	0·14	0·10	0·14	0·13
5. Liverpool - - - - 106·3	0·15	0·14	0·10	0·11	0·05	0·05	0·10	0·17	0·13	0·11	0·09	0·09	0·09	0·15	0·25	0·23	0·18	0·13	0·10	0·20
6. Sheffield - - - 14·5	0·07	0·07	0·06	0·08	0·04	0·07	0·13	0·12	0·06	0·05	0·03	0·07	0·07	0·04	0·04	0·03	0·06	0·09	0·16	0·16
7. Hull - - - - 42·7	0·02	0·06	0·05	0·09	0·05	0·07	0·09	0·04	0·10	0·03	0·03	0·08	0·12	0·15	0·04	0·02	0·06	0·05	0·08	0·09
8. Plymouth - - - - 53·0	0·32	0·26	0·06	0·08	0·04	0·06	0·23	0·40	0·35	0·32	0·09	0·12	0·16	0·12	0·13	0·13	0·07	0·13	0·53	0·18
9. Brighton - - - 45·9	0·10	0·11	0·04	0·20	0·09	0·08	0·05	0·06	0·03	0·03	0·05	0·07	0·04	0·13	0·16	0·19	0·26	0·21	0·11	0·12
10. Leeds - - - - - 14·4	0·09	0·04	0·08	0·10	0·08	0·07	0·06	0·05	0·06	0·04	0·04	0·10	0·13	0·20	0·07	0·08	0·03	0·05	0·05	0·06
11. Cardiff - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	0·24	0·24	0·35	0·37	0·12	0·17	0·07	0·06	0·11
(K.) Ten Provincial towns 29·45	..	..	..	..	..	..	..	..	..	..	..	0·096	0·107	0·136	0·139	0·139	0·116	0·099	0·119	0·129
(B.) Group I. as a whole - 40·04	..	..	..	..	..	..	..	..	..	..	..	0·176	0·193	0·201	0·192	0·184	0·192	0·237	0·286	0·261
GROUP II.																				
(C.) Group II. as a whole - 18·66	0·113	0·056	0·015	0·059	0·047	0·086	0·073	0·086	0·068	0·060	0·039	0·064	0·095	0·128	0·113	0·064	0·078	0·132	0·076	0·098
12. Bradford - - - 25·5	0·13	0·10	0·02	0·02	0·07	0·13	0·10	0·12	0·11	0·10	0·05 |	0·03	0·03	0·04	0·09	0·04	0·06	0·02	0·06	0·03
13. Norwich - - - - 11·8	0·16	0·04	0·02	0·10	0·04	0·11	0·08	0·13	0·11 |	0·03	0·02	0·03	0·06	0·14	0·09	0·13	0·22	0·31	0·16	0·27
14. Nottingham - - 18·9	0·05	—	—	0·10	0·02	0·02	0·02	0·04 |	0·01	0·03	0·04	0·11	0·18	0·20	0·15	0·05	0·03	0·16	0·06	0·07
GROUP III.																				
(D.) Seven towns - - 37·69	0·077	0·072	0·074	0·093	0·116	0·073	0·091	0·112	0·105	0·106	0·239	0·162	0·100	0·108	0·119	0·131	0·194	0·233	0·332	0·362
15. Sunderland - - - 42·3	0·16	0·09	0·16	0·13	0·08	0·06	0·13	0·12	0·10	0·04	0·07	0·15	0·16	0·12	0·10 |	0·04	0·05	0·11	0·17	0·09
16. Portsmouth - - - 28·6	0·09	0·16	0·13	0·20	0·15	0·08	0·03	0·02	0·05	0·17	1·60	0·81	0·17 |	0·30	0·30	0·44	0·32	0·11	0·21	0·29
17. Newcastle - - - 27·1	0·11	0·06	0·08	0·10	0·07	0·07	0·07	0·12	0·03	0·03	0·04	0·03 |	0·07	0·10	0·15	0·11	0·18	0·19	0·18	0·27
18. Salford - - - - 34·4	0·10	0·09	0·06	0·10	0·17	0·07	0·07	0·10	0·12	0·10	0·11	0·10 |	0·13	0·10	0·09	0·07	0·12	0·31	0·87	1·02
19. Manchester - - 79·5	0·03	0·05	0·03	0·03	0·12	0·08	0·09	0·12	0·14	0·10	0·04 |	0·07	0·09	0·06	0·06	0·09	0·20	0·34	0·41	0·39
20. Oldham - - - - 24·0	0·10	0·05	0·01	0·13	0·12	0·02	0·13	0·20	0·11	0·06 |	0·09	0·09	0·07	0·04	0·13	0·22	0·45	0·25	0·12	0·05
21. Leicester - - - 38·5	0·06	0·03	0·14	0·08	0·07	0·11	0·09	0·04	0·09 |	0·19	0·08	0·04	0·05	0·10	0·11	0·03	0·09	0·10	0·08	0·09
22. Bolton - - - - 36·5	..	..	..	..	..	..	.. |	..	..	..	..	0·08	0·06	0·04	0·06	0·06	0·05	0·08	0·29	0·15
23. Blackburn - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	0·02	0·00	0·02	0·01	—	0·01	0·01	0·04	0·04
24. Derby - - - - 22·9	..	..	..	..	..	..	..	..	.. |	..	..	0·04	0·01	0·01	0·01	0·02	0·07	0·07	0·20	0·21
25. Preston - - - 25·2	..	..	..	..	..	..	..	..	..	.. |	..	0·04	0·14	0·11	0·16	0·08	0·26	0·23	0·30	0·14
26. Huddersfield - - 8·2	..	..	..	..	..	..	..	..	..	.. |	..	0·08	0·02	0·05	0·03	0·10	0·42	0·16	0·13	0·05
27. Birkenhead - - 21·3	..	..	..	..	..	..	..	..	..	..	.. |	0·03	0·02	0·08	0·14	0·17	0·11	0·07	0·08	0·12
28. Halifax - - - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·07 |	0·05	0·03	0·10	0·21	0·08	0·05	0·15	0·16
(E.) Seven added towns - 17·53	..	..	..	..	..	..	..	..	..	..	..	0·052	0·045	0·047	0·073	0·085	0·139	0·096	0·172	0·123
(F.) Group III. as a whole 26·95	..	..	..	..	..	..	..	..	..	..	..	0·122	0·081	0·087	0·103	0·115	0·175	0·185	0·276	0·279
(H.) Twenty-eight towns 34·34	..	..	..	..	..	..	..	..	..	..	..	0·158	0·164	0·176	0·169	0·162	0·182	0·220	0·271	0·256

Table VIII.—DEATH RATES.—"FEVER."

Table giving for the large Towns of England the Death Rates from "Fever" (chiefly Enteric) in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several Towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) Twenty Towns - 37·67	0·768	0·594	0·585	0·574	0·528	0·452	0·421	0·424	0·297	0·304	0·313	0·364	0·344	0·290	0·226	0·226	0·217	0·204	0·202	0·199
GROUP I.																				
(A) Towns 1–10 - - 40·86	0·721	0·549	0·546	0·547	0·496	0·426	0·412	0·413	0·299	0·286	0·319	0·361	0·342	0·285	0·194	0·200	0·194	0·182	0·184	0·177
1. London - - - 50·8	0·53	0·40	0·46	0·46	0·37	0·34	0·35	0·38	0·30	0·24	0·31	0·29	0·27	0·27	0·18	0·18	0·17	0·18	0·15	0·16
(I.) Nine Provincial towns - 30·34	1·046	0·801	0·696	0·712	0·720	0·590	0·523	0·484	0·305	0·374	0·330	0·487	0·455	0·318	0·228	0·246	0·244	0·191	0·254	0·209
2. Bristol - - - 46·6	0·63	0·44	0·57	0·45	0·49	0·46	0·70	0·45	0·20	0·20	0·29	0·23	0·17	0·22	0·10	0·14	0·12	0·14	0·17	0·16
3. Wolverhampton - - 22·4	0·79	0·48	1·18	0·65	0·52	0·35	0·27	0·35	0·12	0·21	0·16	0·13	0·19	0·15	0·11	0·19	0·21	0·16	0·15	0·13
4. Birmingham - - - 47·9	0·53	0·54	0·58	0·55	0·53	0·38	0·38	0·38	0·22	0·20	0·14	0·19	0·18	0·20	0·18	0·15	0·18	0·14	0·11	0·13
5. Liverpool - - 106·3	1·79	0·88	0·62	0·85	0·92	0·74	0·71	0·66	0·47	0·47	0·53	1·08	1·00	0·37	0·35	0·37	0·37	0·31	0·41	0·24
6. Sheffield - - 14·5	0·91	0·99	0·96	0·75	1·25	0·96	0·64	0·46	0·33	0·71	0·22	0·23	0·33	0·30	0·24	0·20	0·26	0·19	0·23	0·22
7. Hull - - - 42·7	0·86	1·37	0·95	1·30	0·80	0·55	0·41	0·65	0·37	0·31	0·39	0·45	0·36	0·42	0·23	0·15	0·15	0·16	0·24	0·18
8. Plymouth - - 53·0	0·48	0·71	0·55	0·55	0·47	0·51	0·56	0·43	0·31	0·29	0·36	0·23	0·31	0·34	0·25	0·56	0·21	0·29	0·21	0·29
9. Brighton - - 45·9	0·37	0·27	0·33	0·35	0·26	0·14	0·20	0·15	0·10	0·20	0·40	0·21	0·26	0·15	0·16	0·11	0·12	0·14	0·16	0·11
10. Leeds - - 14·4	1·27	1·12	0·78	0·75	0·50	0·63	0·38	0·42	0·27	0·40	0·35	0·50	0·38	0·44	0·22	0·29	0·30	0·15	0·36	0·30
11. Cardiff - - 17·7	..	..	..	..	..	..	..	..	..	..	..	0·23	0·35	0·38	0·35	0·63	0·15	0·30	0·22	0·16
(K.) Ten Provincial towns 29·45	..	..	..	..	..	..	..	..	..	..	..	0·477	0·450	0·322	0·235	0·265	0·240	0·198	0·254	0·207
(B.) Group I. as a whole - 40·04	..	..	..	..	..	..	..	..	..	..	..	0·359	0·341	0·286	0·197	0·207	0·193	0·184	0·185	0·176
GROUP II.																				
(C.) Group II. as a whole - 18·66	0·886	0·820	0·784	0·593	0·578	0·413	0·368	0·365	0·259	0·344	0·230	0·258	0·287	0·319	0·364	0·273	0·253	0·260	0·272	0·233
12. Bradford - - 25·5	0·91	0·89	0·84	0·67	0·50	0·44	0·35	0·41	0·25	0·31	0·16 |	0·22	0·28	0·27	0·20	0·18	0·19	0·11	0·25	0·15
13. Norwich - - 11·8	0·48	0·68	0·75	0·41	0·52	0·35	0·46	0·28	0·33 |	0·48	0·18	0·09	0·11	0·33	0·09	0·40	0·18	0·17	0·21	0·30
14. Nottingham - - 18·9	1·23	0·84	0·74	0·62	0·75	0·43	0·31	0·36 |	0·24	0·31	0·32	0·38	0·38	0·35	0·24	0·31	0·36	0·45	0·32	0·28
GROUP III.																				
(D.) Seven towns - - 37·69	0·971	0·755	0·726	0·704	0·672	0·597	0·486	0·506	0·302	0·388	0·314	0·426	0·381	0·307	0·332	0·337	0·320	0·291	0·262	0·296
15. Sunderland - - 42·3	2·23	1·05	0·52	0·67	0·43	0·57	0·61	0·47	0·26	0·39	0·26	0·70	0·62	0·22	0·27 |	0·24	0·29	0·23	0·29	0·37
16. Portsmouth - - 28·6	0·66	1·06	0·85	0·89	0·84	0·58	0·71	0·75	0·51	0·58	0·47	0·89	0·74 |	0·45	0·66	0·86	0·37	0·20	0·22	0·32
17. Newcastle - - 27·1	0·77	0·64	0·84	0·87	0·69	0·54	0·33	0·62	0·40	0·25	0·44	0·44 |	0·50	0·36	0·46	0·22	0·32	0·17	0·14	0·20
18. Salford - - - 34·4	0·68	0·66	0·65	0·88	0·77	0·50	0·62	0·61	0·30	0·56	0·32	0·35 |	0·40	0·51	0·35	0·33	0·43	0·51	0·53	0·43
19. Manchester - - 79·5	1·05	0·71	0·82	0·62	0·60	0·70	0·49	0·40	0·22	0·24	0·23 |	0·35	0·25	0·23	0·21	0·33	0·32	0·34	0·26	0·31
20. Oldham - - - 24·0	0·43	0·56	0·46	0·49	0·91	0·74	0·22	0·31	0·19	0·20 |	0·36	0·20	0·23	0·21	0·18	0·21	0·22	0·18	0·15	0·12
21. Leicester - - 38·5	0·79	0·72	0·62	0·55	0·59	0·39	0·21	0·28	0·19 |	0·42	0·26	0·19	0·09	0·13	0·30	0·16	0·27	0·28	0·19	0·21
22. Bolton - - - 36·5	..	..	..	..	..	..	.. |	..	..	..	..	0·29	0·28	0·32	0·18	0·15	0·32	0·31	0·27	0·24
23. Blackburn - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	0·48	0·90	0·67	0·30	0·31	0·35	0·37	0·21	0·32
24. Derby - - - 22·9	..	..	..	..	..	..	..	..	.. |	..	..	0·37	0·22	0·55	0·12	0·36	0·23	0·31	0·19	0·18
25. Preston - - 25·2	..	..	..	..	..	..	..	..	..	.. |	..	0·65	0·57	0·42	0·36	0·58	0·62	0·29	0·60	0·28
26. Huddersfield - - 8·2	..	..	..	..	..	..	..	..	..	.. |	..	0·22	0·20	0·13	0·11	0·15	0·10	0·12	0·10	0·25
27. Birkenhead - - 21·3	..	..	..	..	..	..	..	..	..	..	.. |	0·55	0·34	0·27	0·15	0·20	0·26	0·38	0·36	0·44
28. Halifax - - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·34 |	0·40	0·33	0·19	0·19	0·15	0·10	0·25	0·18
(E.) Seven added towns - 17·53	..	..	..	..	..	..	..	..	..	..	..	0·418	0·430	0·396	0·208	0·280	0·303	0·277	0·287	0·279
(F.) Group III. as a whole 26·95	..	..	..	..	..	..	..	..	..	..	..	0·423	0·398	0·339	0·287	0·318	0·314	0·286	0·271	0·290
(H.) Twenty-eight towns 34·34	..	..	..	..	..	..	..	..	..	..	..	0·367	0·351	0·299	0·226	0·235	0·224	0·210	0·208	0·204

Table IX.—DEATH RATES.—MEASLES.

Table giving for the large Towns of England the Death Rates from Measles in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns** - 37·67	0·559	0·478	0·587	0·536	0·383	0·578	0·532	0·411	0·588	0·489	0·550	0·655	0·539	0·615	0·728	0·517	0·821	0·495	0·659	0·681
GROUP I.																				
(A.) **Towns 1–10** - 40·86	0·556	0·491	0·579	0·529	0·361	0·573	0·578	0·405	0·632	0·436	0·651	0·588	0·568	0·612	0·679	0·536	0·733	0·526	0·628	0·730
1. London - - 50·8	0·44	0·51	0·66	0·48	0·42	0·49	0·66	0·42	0·68	0·41	0·66	0·61	0·62	0·57	0·74	0·52	0·72	0·59	0·56	0·77
(I.) **Nine Provincial towns** - 30·34	0·761	0·461	0·454	0·610	0·275	0·716	0·446	0·390	0·565	0·504	0·632	0·562	0·477	0·670	0·579	0·570	0·769	0·417	0·751	0·628
2. Bristol - - - 46·6	0·33	0·31	0·58	0·35	0·56	0·39	0·69	0·26	0·37	0·36	0·57	0·27	0·17	0·23	0·75	0·47	0·70	0·30	0·84	0·42
3. Wolverhampton - - 22·4	0·38	0·17	0·04	0·69	0·03	0·53	0·12	0·12	0·72	0·08	0·03	0·85	0·00	1·22	0·01	1·39	0·34	0·47	0·49	0·40
4. Birmingham - - 47·9	1·16	0·13	0·35	0·37	0·38	0·23	0·81	0·13	0·43	0·16	0·30	0·37	0·38	0·80	0·29	0·91	0·56	0·46	0·46	0·75
5. Liverpool - - 106·3	0·96	0·96	0·69	0·87	0·23	1·32	0·37	0·82	0·88	0·51	1·37	0·74	1·13	1·13	1·34	0·52	1·25	0·63	0·94	1·01
6. Sheffield - - 14·5	0·66	0·31	0·77	0·30	0·17	0·65	0·37	0·22	0·38	0·28	0·72	0·26	0·48	0·06	0·69	0·23	0·94	0·15	0·71	0·72
7. Hull - - - 42·7	0·72	0·10	0·31	0·38	0·23	0·33	0·29	0·03	0·26	1·35	0·05	0·73	0·07	0·48	0·09	0·15	0·71	0·02	0·94	0·08
8. Plymouth - - 53·0	1·52	0·32	0·13	1·94	0·01	1·52	0·05	1·01	0·63	3·87	0·26	0·77	0·35	0·64	0·28	1·03	0·08	0·86	0·20	0·68
9. Brighton - - 45·9	0·23	0·51	0·06	0·61	0·02	0·57	0·02	0·22	0·26	0·20	0·19	1·36	0·50	0·09	0·31	0·09	0·63	0·03	0·41	0·53
10. Leeds - - 14·4	0·38	0·48	0·18	0·07	0·39	0·63	0·42	0·32	0·68	0·22	0·41	0·48	0·04	0·66	0·06	0·71	0·50	0·58	0·97	0·27
11. Cardiff - - 17·7	..	..	..	..	..	..	..	..	..	..	..	0·37	0·12	0·97	1·82	0·16	0·53	0·88	0·31	0·45
(K.) **Ten Provincial towns** 29·45	..	..	..	..	..	..	..	..	..	..	..	0·554	0·464	0·685	0·637	0·553	0·759	0·442	0·731	0·622
(B.) **Group I. as a whole** 40·01	..	..	..	..	..	..	..	..	..	..	..	0·585	0·562	0·619	0·699	0·530	0·730	0·533	0·622	0·726
GROUP II.																				
(C.) **Group II. as a whole** - 18·66	0·080	0·770	0·157	0·482	0·336	0·521	0·181	0·249	0·466	0·762	0·128	0·943	0·091	0·639	0·306	0·561	0·656	0·472	0·450	0·593
12. Bradford - - 25·5	0·05	1·26	0·07	0·87	0·14	0·82	0·12	0·30	0·49	0·36	0·07 |	1·17	0·12	0·52	0·17	0·53	0·65	0·61	0·56	1·04
13. Norwich - - 11·8	0·01	0·70	0·10	0·07	0·22	0·14	0·35	0·11	0·53 |	0·14	0·14	1·04	0·08	0·62	0·00	—	1·50	—	0·32	0·32
14. Nottingham - - 18·9	0·18	0·02	0·35	0·20	0·76	0·34	0·16	0·27 |	0·41	1·45	0·18	0·70	0·07	0·74	0·59	0·86	0·27	0·57	0·40	0·25
GROUP III.																				
(D.) **Seven towns** - 37·69	0·718	0·324	0·765	0·581	0·515	0·623	0·406	0·509	0·405	0·658	0·188	0·892	0·568	0·625	1·155	0·403	1·322	0·349	0·896	0·477
15. Sunderland - - 42·3	0·59	0·50	0·32	0·57	0·05	0·40	0·01	0·85	0·01	0·86	0·03	1·63	0·13	0·06	3·11 |	0·03	1·35	0·02	1·03	0·16
16. Portsmouth - - 28·6	0·33	0·45	0·13	0·47	0·54	1·05	0·09	0·38	0·08	0·42	0·06	1·22	0·08 |	1·17	0·05	1·34	0·06	0·33	0·06	0·03
17. Newcastle - - - 27·1	0·54	0·18	0·58	0·12	0·35	0·19	0·13	0·11	0·65	0·10	0·25	0·10 |	1·36	0·10	2·14	0·26	1·28	0·05	0·52	0·04
18. Salford - - - 34·4	1·27	0·18	1·76	0·99	0·96	0·98	0·76	0·40	0·70	0·64	0·21	0·94 |	0·86	0·54	0·97	0·25	1·69	0·69	1·14	0·52
19. Manchester - - 79·5	0·87	0·32	1·01	0·65	0·61	0·64	0·64	0·49	0·40	0·58	0·34 |	1·04	0·75	0·58	1·12	0·23	1·88	0·34	1·39	0·96
20. Oldham - - 24·0	0·69	0·43	0·09	0·92	0·36	0·57	0·10	0·96	0·08	0·69 |	0·07	0·67	0·05	1·64	0·45	0·74	1·37	0·42	0·97	0·72
21. Leicester - - - 38·5	0·31	0·28	0·59	0·24	0·43	0·43	0·33	0·36	0·52 |	1·23	0·06	0·59	0·11	0·41	0·34	0·33	0·65	0·54	0·45	0·20
22. Bolton - - 36·5	..	..	..	..	..	..	.. |	..	..	..	..	1·57	0·02	1·01	0·33	1·28	0·87	0·29	1·42	0·83
23. Blackburn - - 13·2	..	..	..	..	..	..	..	..	.. |	..	..	1·73	0·03	0·99	0·01	2·06	0·80	1·01	1·73	0·15
24. Derby - - 22·9	..	..	..	..	..	..	..	..	..	.. |	..	0·36	0·27	0·41	0·30	0·04	1·16	0·22	0·05	1·29
25. Preston - - 25·2	..	..	..	..	..	..	..	..	..	..	.. |	1·28	0·03	0·59	0·07	2·06	0·30	0·02	2·44	0·74
26. Huddersfield - - 8·2	..	..	..	..	..	..	..	..	..	..	.. |	0·96	0·39	0·17	0·64	0·19	1·40	0·34	0·97	0·04
27. Birkenhead - - 21·3	..	..	..	..	..	..	..	..	..	..	..	0·38	0·43	0·49	0·84	0·23	0·88	0·19	0·71	0·93
28. Halifax - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·17 |	0·03	0·72	0·00	1·12	0·18	0·14	0·89	0·30
(E.) **Seven added towns** - 17·53	..	..	..	..	..	..	..	..	..	..	..	0·988	0·158	0·664	0·305	1·059	0·797	0·335	1·223	0·621
(F.) **Group III. as a whole** 26·95	..	..	..	..	..	..	..	..	..	..	..	0·926	0·422	0·639	0·853	0·632	1·138	0·345	1·010	0·527
(H.) **Twenty-eight towns** 34·34	..	..	..	..	..	..	..	..	..	..	..	0·678	0·506	0·623	0·709	0·554	0·815	0·487	0·698	0·675

Table X.—Death Rates.—Whooping Cough.

Table giving for the large Towns of England the Death Rates from Whooping Cough in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) Twenty towns - 37·67	0·683	0·893	0·615	0·601	0·865	0·659	0·671	1·027	0·747	0·809	0·568	0·934	0·471	0·690	0·605	0·563	0·658	0·623	0·491	0·650
Group I.																				
(A.) Towns 1—10 - - 40·86	0·710	0·920	0·668	0·582	0·886	0·693	0·662	1·087	0·776	0·837	0·565	1·020	0·4 7	0·740	0·620	0·582	0·690	0·641	0·467	0·711
1. London - - - - 50·8	0·70	0·98	0·80	0·55	0·94	0·78	0·49	1·24	0·82	0·93	0·51	1·21	0·40	0·80	0·63	0·71	0·73	0·74	0·42	0·77
(I.) Nine Provincial towns - 30·34	0·721	0·815	0·440	0·652	0·814	0·551	0·955	0·859	0·719	0·705	0· 57	0·696	0·603	0·617	0·616	0·362	0·634	0·483	0·548	0·579
2. Bristol - - - - 46·6	0·32	0·70	0·48	0·23	0·52	0·25	1·25	0·33	0·87	0·48	0·19	0·97	0·18	0·45	0·73	0·48	0·59	0·17	0·46	0·89
3. Wolverhampton - - 22·4	0·82	0·68	0·41	0·52	0·81	0·51	0·31	1·30	0·24	0·54	0·58	0·76	0·26	0·23	0·49	0·28	0·36	0·72	0·59	0·33
4. Birmingham - - 47·9	0·91	0·75	0·50	0·69	1·18	0·53	0·96	1·16	0·98	0·56	0·90	0·80	0·44	0·70	0·62	0·22	0·91	0·55	0·65	0·46
5. Liverpool - - - - 106·3	1·05	1·18	0·33	1·01	0·71	0·94	1·39	0·78	0·45	1·21	0·73	0·81	0·73	1·01	0·75	0·29	0·82	0·59	0·66	0·68
6. Sheffield - - - - 14·5	0·73	0·67	0·64	0·53	0·71	0·51	0·88	0·75	1·08	0·52	0·75	0·56	0·59	0·42	0·74	0·53	0·57	0·46	0·46	0·50
7. Hull - - - - - 42·7	0·21	0·80	0·34	0·37	0·99	0·45	0·44	0·40	0·61	0·95	0·24	0·21	1·40	0·35	0·18	0·43	0·42	0·22	0·56	0·37
8. Plymouth - - - - 53·0	0·72	0·29	0·51	0·87	0·74	0·25	0·40	2·08	0·33	0·68	0·46	0·44	0·81	0·22	1·01	0·23	0·63	0·05	0·66	0·35
9. Brighton - - - - 45·9	0·09	0·27	0·45	0·53	0·82	0·11	0·53	0·81	0·51	0·37	0·31	1·12	0·55	0·32	0·40	0·60	0·27	0·43	0·22	0·87
10. Leeds - - - - 14·4	0·56	0·82	0·40	0·52	0·78	0·42	0·74	0·92	0·79	0·36	0·84	0·48	0·49	0·50	0·46	0·35	0·38	0·65	0·43	0·50
11. Cardiff - - - 17·7	..	..	..	..	..	..	..	..	..	..	..	0·38	0·65	0·26	1·07	0·38	0·38	0·41	0·59	0·29
(K.) Ten Provincial towns 29·45	..	..	..	..	..	..	..	..	..	..	..	0· 84	0·606	0·603	0·638	0·364	0·624	0·481	0·552	0·566
(B.) Group I. as a whole - 40·04	..	..	..	..	..	..	..	..	..	..	..	1·011	0·480	0·732	0·628	0·579	0·686	0·638	0·471	0·703
Group II.																				
(C.) Group II. as a whole - 18·66	0·498	0·502	0·476	0·324	0 834	0·318	0·491	0·809	0·364	0·592	0·429	0·425	0·347	0·438	0·559	0·306	0·715	0·370	0·723	0·354
12. Bradford - - - 25·5	0·76	0·55	0·73	0·43	0·67	0·39	0·74	0·86	0·38	0·64	0·59 |	0·51	0·38	0·29	0·60	0·10	0·79	0·20	0·92	0·25
13. Norwich - - - 11·8	0·47	0·59	0·24	0·21	1·72	0·07	0·10	1·37	0·29 |	0·73	0·01	0·36	0·19	0·24	0·44	0·40	0·54	0·70	0·27	0·83
14. Nottingham - - - 18·9	0·08	0·35	0·27	0·24	0·35	0·40	0·40	0·48 |	0·38	0·47	0·47	0·39	0·40	0·66	0·58	0·47	0·73	0·38	0·75	0·22
Group III.																				
(D.) Seven towns - - 37·69	0·603	0·886	0·390	0·786	0·757	0·590	0·775	0·799	0·751	0·748	0·637	0·695	0·491	0·535	0·543	0·577	0·477	0·629	0·515	0·467
15. Sunderland - - - 42·3	0·73	0·81	0·57	0·15	1·27	0·49	0·56	1·58	0·40	0·62	0·38	0·90	0·16	0·77	0·27 |	0·41	0·45	0·36	0·55	0·41
16. Portsmouth - - - 28·6	0·58	0·14	0·14	0·89	0·06	0·43	0·56	0·81	0·08	0·38	0·51	0·39	0·42 |	0·07	0·35	0·71	0·29	0·17	0·61	0·24
17. Newcastle - - - 27·1	0·69	0·48	0·27	0·78	0·47	0·30	0·59	0·60	0·02	0·85	0·45	0·71 |	0·35	0·52	0·32	0·61	0·46	0·40	0·73	0·44
18. Salford - - - 34·4	0·90	1·31	0·37	0·95	0·99	1·05	0·57	0·70	0·72	1·03	0·90	0·84 |	0·56	0·69	0·69	0·68	0·35	1·16	0·31	0·91
19. Manchester - - - 79·5	0·60	1·31	0·44	0·92	0·88	0·80	1·00	0·65	1·26	0·87	0·70 |	0·89	0·73	0·62	0·70	0·69	0·54	0·84	0·43	0·42
20. Oldham - - - 24·0	0·34	0·70	0·22	1·05	0·61	0·18	1·00	0·68	0·45	0·48 |	0·30	0·70	0·33	0·51	0·85	0·45	0·83	0·31	1·00	0·62
21. Leicester - - - 38·5	0·23	0·43	0·61	0·41	0·83	0·27	0·57	0·69	0·49 |	0·22	0·98	0·16	0·47	0·53	0·40	0·20	0·42	0·64	0·19	0·11
22. Bolton - - - 36·5	..	..	..	..	..	..	..	..	..	..	..	0·70	0·32	0·96	0·56	0·67	0·26	0·57	0·57	0·94
23. Blackburn - - 13·2	..	..	..	..	..	..	..	..	..	..	..	0·54	0·30	0·02	1·30	0·21	0·81	0·63	0·66	0·19
24. Derby - - - 22·9	..	..	..	..	..	..	..	..	..	..	..	0·34	0·39	0·25	0·48	0·49	0·37	0·59	0·10	0·64
25. Preston - - - 25·2	..	..	..	..	..	..	..	..	..	..	..	0·81	0·31	0·33	0·95	0·65	0·40	0·27	1·85	0·34
26. Huddersfield - - 8·2	..	..	..	..	..	..	..	..	..	..	..	0·64	0·51	0·68	0·28	0·33	0·67	0·41	0·16	0·40
27. Birkenhead - - 21·3	..	..	..	..	..	..	..	..	..	..	..	1·02	0·35	0·11	0·72	0·20	0·35	0·24	0·96	0·43
28. Halifax - - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·24 |	0·13	0·44	0·17	0·21	0·16	0·45	0·04	0·23
(E.) Seven added towns - 17·53	..	..	..	..	..	..	..	..	..	..	..	0·620	0·327	0·406	0·667	0·402	0·441	0·454	0·651	0·467
(F.) Group III. as a whole 26·95	..	..	..	..	..	..	..	..	..	..	..	0·668	0·433	0·489	0·587	0·517	0·464	0·567	0·563	0·467
(H.) Twenty-eight towns 34·34	..	..	..	..	..	..	..	..	..	..	..	0·905	0·462	0·664	0·616	0·550	0·639	0·607	0·505	0·632

Table XI.—DEATH RATES.—DIARRHŒA.

Table giving for the Large Towns of England the Death Rates from Diarrhœa in each of the Twenty Years 1871–90, together with several Group Averages for each Year. Group I.—Towns under *No System* of Notification until after the passing of the Infectious Diseases (Notification) Act of 1889. Group II.—Towns under the *Single* or *Householder System*. Group III.—Towns which by local Acts have gradually come under the *Dual System* of Notification.

The towns concerning which the Registrar-General gives imperfect Data are recessed, as also are the Group Averages including them.

The black mark (|) indicates the time at which the particular system of Notification came into force in the several towns of Groups II. and III.

Large Towns and Number of Persons to an Acre in 1881.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns** - 37·67	1·600	1·397	1·413	1·256	1·269	1·223	0·825	1·323	0·564	1·401	0·793	0·831	0·766	1·242	0·693	1·195	1·030	0·619	0·858	0·818
GROUP I.																				
(A.) **Towns 1—10** - 40·86	1·476	1·320	1·333	1·150	1·193	1·165	0·796	1·269	0·561	1·292	0·787	0·757	0·744	1·163	0·672	1·124	0·994	0·604	0·789	0·762
1. London - 50·8	1·19	1·06	1·16	0·90	0·93	0·99	0·69	1·01	0·52	1·02	0·78	0·56	0·69	0·95	0·68	0·98	0·94	0·55	0·65	0·65
(I.) **Nine Provincial towns** - 30·34	1·967	1·785	1·650	1·588	1·673	1·464	0·984	1·743	0·640	1·807	0·796	1·105	0·862	1·524	0·681	1·375	1·107	0·734	1·042	0·946
2. Bristol - 40·6	0·94	0·86	0·75	0·84	0·66	1·12	0·64	0·95	0·35	0·94	0·43	0·52	0·46	0·69	0·49	0·55	0·54	0·31	0·57	0·43
3. Wolverhampton - 22·4	1·02	1·33	1·36	1·42	1·49	1·55	0·87	1·32	0·78	1·53	0·63	1·13	0·74	1·68	0·66	1·76	1·32	0·73	0·93	0·82
4. Birmingham - 47·9	2·03	1·82	2·06	1·71	2·29	1·74	1·18	1·76	0·61	1·95	0·82	1·34	0·98	1·73	0·81	1·72	1·34	0·74	1·14	1·05
5. Liverpool - 106·3	2·28	2·00	1·89	1·72	1·63	1·33	1·15	1·82	0·75	1·87	0·92	1·07	0·95	1·54	0·78	1·47	1·19	0·85	1·13	0·99
6. Sheffield - 14·5	2·26	1·78	1·71	1·87	1·62	1·72	0·72	1·70	0·66	2·02	0·75	1·05	0·95	1·76	0·68	1·51	0·97	0·99	1·07	1·14
7. Hull - 42·7	1·46	2·22	1·77	1·70	1·97	1·70	1·49	2·87	0·48	2·43	0·90	1·75	0·75	1·79	0·42	1·37	1·11	0·39	1·13	0·96
8. Plymouth - 53·0	1·39	0·95	1·06	1·22	0·93	0·56	1·55	1·12	0·46	1·26	0·35	0·49	0·46	0·61	0·46	0·72	1·01	0·37	0·65	0·73
9. Brighton - 45·9	1·58	1·43	0·99	0·81	1·07	0·69	0·79	1·04	0·49	1·22	0·45	0·54	0·90	0·80	0·32	0·85	0·95	0·53	0·59	0·83
10. Leeds - 14·4	2·53	2·28	1·83	1·84	2·00	1·74	0·75	2·13	0·80	2·01	1·03	1·33	0·88	1·61	0·75	1·43	1·15	0·93	1·24	0·98
11. Cardiff - 17·7	..	..	..	..	..	..	..	..	..	..	..	1·10	0·60	1·28	0·72	1·35	0·83	0·63	0·48	0·87
(K.) **Ten Provincial towns** 29·45	..	..	..	..	..	..	..	..	..	..	..	1·105	0·851	1·516	0·684	1·379	1·097	0·731	1·019	0·948
(B.) **Group I. as a whole** - 40·04	..	..	..	..	..	..	..	..	..	..	..	0·762	0·742	1·165	0·673	1·129	0·991	0·605	0·784	0·766
GROUP II.																				
(C.) **Group II. as a whole** - 18·66	1·794	1·469	1·233	1·400	1·426	1·354	0·707	1·197	0·486	1·642	0·734	1·142	0·698	1·656	0·584	1·498	1·085	0·641	0·964	0·938
12. Bradford - 25·5	1·71	1·57	1·29	1·44	1·56	1·27	0·59	1·09	0·39	1·53	0·45 |	1·26	0·59	1·33	0·44	1·09	1·00	0·65	1·02	0·88
13. Norwich - 11·8	1·74	1·37	0·98	1·22	1·33	1·48	0·91	1·49	0·60 |	2·20	0·59	0·85	0·53	1·67	0·44	2·36	0·77	0·69	0·84	1·12
14. Nottingham - 18·9	2·00	1·41	1·38	1·48	1·27	1·39	0·71	1·14 |	0·53	1·49	1·07	1·19	0·87	1·90	0·80	1·53	1·33	0·61	1·00	0·87
GROUP III.																				
(D.) **Seven towns** - 37·69	2·180	1·780	1·891	1·763	1·608	1·489	1·023	1·656	0·613	1·877	0·850	1·099	0·906	1·483	0·845	1·427	1·198	0·689	1·161	1·046
15. Sunderland - 42·3	1·39	1·11	1·49	1·64	1·44	1·35	0·78	1·76	0·60	1·71	0·78	0·99	0·72	1·28	0·64 |	1·72	0·97	0·50	1·48	1·05
16. Portsmouth - 28·6	0·93	0·93	0·92	0·96	1·16	0·81	1·08	1·12	0·39	1·22	0·57	0·86	0·64 |	0·83	0·85	1·33	1·06	0·63	0·74	0·67
17. Newcastle - 27·1	1·53	1·26	1·72	1·76	1·48	1·11	0·88	1·66	0·42	1·16	1·03	1·06 |	0·73	1·00	0·65	0·88	0·67	0·36	1·00	0·69
18. Salford - 34·4	2·86	1·91	2·06	2·11	1·96	1·77	1·16	1·80	0·72	2·24	0·87	1·30 |	1·10	2·01	1·33	2·08	1·71	0·99	1·74	1·25
19. Manchester - 79·5	2·79	2·16	2·14	1·92	1·49	1·63	0·92	1·51	0·68	1·72	0·72 |	1·10	1·04	1·42	0·69	1·28	1·26	0·78	1·07	1·19
20. Oldham - 24·0	1·16	1·24	1·18	0·99	1·10	1·04	0·52	0·77	0·33	1·05 |	0·63	0·64	0·67	1·11	0·32	1·04	0·69	0·31	0·57	0·59
21. Leicester - 38·5	3·23	3·12	3·10	2·47	2·84	2·40	1·65	2·62	0·73 |	3·27	1·54	1·68	1·16	2·50	1·46	1·91	1·83	1·08	1·60	1·51
22. Bolton - 36·5	..	..	..	..	..	..	.. |	..	..	..	..	1·45	1·49	1·85	0·75	1·49	1·40	1·04	1·05	1·11
23. Blackburn - 13·2	..	..	..	..	..	..	..	..	..	..	..	1·30	1·12	1·94	0·86	1·43	1·09	0·65	1·16	1·26
24. Derby - 22·9	..	..	..	..	..	..	..	..	..	..	..	0·37	0·48	0·94	0·53	0·85	0·72	0·34	0·86	0·48
25. Preston - 25·2	..	..	..	..	..	..	..	..	..	..	..	2·48	2·57	2·85	1·93	2·04	2·25	1·52	2·27	2·51
26. Huddersfield - 8·2	..	..	..	..	..	..	..	..	..	..	..	0·64	0·46	0·64	0·23	0·49	0·40	0·19	0·38	0·37
27. Birkenhead - 21·3	..	..	..	..	..	..	..	..	..	..	..	0·71	0·48	0·88	0·32	1·18	0·81	0·41	0·70	0·80
28. Halifax - 22·8	..	..	..	..	..	..	..	..	..	..	..	0·54 |	0·30	0·50	0·26	0·55	0·27	0·18	0·24	0·21
(E.) **Seven added towns** - 17·53	..	..	..	..	..	..	..	..	..	..	..	1·126	1·048	1·483	0·731	1·191	1·036	0·653	0·995	1·031
(F.) **Group III. as a whole** 26·95	..	..	..	..	..	..	..	..	..	..	..	1·108	0·957	1·484	0·804	1·345	1·142	0·676	1·103	1·041
(H.) **Twenty-eight towns** 34·34	..	..	..	..	..	..	..	..	..	..	..	0·857	0·785	1·261	0·696	1·196	1·030	0·622	0·865	0·836

Table XII., Part I.—COMPARISON OF FOUR QUINQUENNIA.

Table giving for the large Towns of England, and for the specified Groups, the Mean Death Rate in each of four Quinquennia, 1871–75, 1876–80, 1881–85, 1886–90.

Part I.—General, Total Zymotic, Notifiable Zymotic, Non-notifiable Zymotic.

Large Towns, with their Population and Number of Persons to an Acre in 1881.	General.				Total Zymotic.				Notifiable Zymotic.				Non-notifiable Zymotic.			
	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.
(G.) **Twenty towns.** 7,610,217 - - - 37·67	24·81	23·26	21·84	21·19	4·794	3·838	3·270	2·913	2·167	1·469	1·134	0·777	2·626	2·369	2·137	2·136
Group I.																
(A.) **Towns 1—10.** 6,004,693 - - - - 40·86	24·19	22·89	21·54	20·73	4·630	3·778	3·295	2·861	2·080	1·426	1·166	0·757	2·550	2·352	2·129	2·103
1. London, 3,831,719 - - - - - 50·8	23·0	22·4	20·9	20·0	4·07	3·63	3·23	2·76	1·73	1·40	1·15	0·71	2·35	2·23	2·08	2·05
(I.) **Nine Provincial towns.** 2,172,074 - - 30·34	26·59	24·18	22·67	22·00	5·626	4·115	3·400	3·034	2·693	1·506	1·185	0·846	2·933	2·610	2·215	2·189
2. Bristol, 207,522 - - - - - 46·6	23·9	22·2	19·2	19·5	3·43	3·00	2·03	2·21	1·74	1·16	0·61	0·67	1·69	1·84	1·43	1·54
3. Wolverhampton, 75,963 - - - - 22·4	25·6	23·3	21·8	21·6	5·18	3·49	2·58	2·61	2·95	1·39	0·73	0·42	2·23	2·10	1·85	2·19
4. Birmingham, 402,314 - - - - 47·9	25·3	23·1	21·0	20·6	5·95	4·10	3·10	2·89	2·68	1·46	0·85	0·50	3·26	2·64	2·25	2·39
5. Liverpool, 554,073 - - - - - 106·3	29·6	27·4	26·8	25·8	6·78	5·09	4·46	3·75	3·30	1·96	1·46	1·17	3·48	3·12	3·00	2·59
6. Sheffield, 285,619 - - - - - 14·5	26·9	24·3	21·9	22·2	6·19	4·55	3·32	3·59	3·25	2·06	1·23	1·39	2·94	2·49	2·09	2·19
7. Hull, 155,122 - - - - - - 42·7	25·2	22·8	21·5	18·4	5·21	3·68	3·80	2·21	2·50	0·87	1·92	0·45	2·71	2·81	1·88	1·77
8. Plymouth, 73,925 - - - - - 53·0	21·8	23·6	20·7	22·2	4·19	4·07	1·99	2·97	1·67	1·01	0·47	1·32	2·52	3·06	1·52	1·65
9. Brighton, 107,953 - - - - - 45·9	20·8	19·8	19·3	17·6	2·86	2·18	2·39	1·99	0·98	0·61	0·76	0·42	1·88	1·57	1·63	1·57
10. Leeds, 310,483 - - - - - - 14·4	27·8	23·9	22·4	21·7	5·76	3·84	3·51	2·91	2·63	1·26	1·51	0·70	3·13	2·59	2·00	2·21
11. Cardiff, 95,664 - - - - - - 17·7	..	..	..	18·3	..	..	..	2·28	..	..	..	0·58	..	..	..	1·71
(K.) **Ten Provincial towns.** 2,268,638 - - 29·45	..	..	..	21·91	..	..	..	3·009	..	..	..	0·835	..	..	..	2·174
(B.) **Group I. as a whole.** 6,100,357 - - 40·04	..	..	..	20·72	..	..	..	2·854	..	..	..	0·755	..	..	..	2·099
Group II.																
(C.) **Group II. as a whole.** 460,036 - - 18·66	25·49	22·77	21·41	20·64	4·611	3·249	2·723	2·631	2·255	1·221	0·899	0·565	2·356	2·028	1·824	2·065
12. Bradford, 184,035 - - - - - 25·5	26·7	23·7	20·6	21·4	4·89	3·36	2·30	2·59	2·28	1·36	0·60	0·54	2·62	1·99	1·70	2·06
13. Norwich, 88,037 - - - - - 11·8	24·3	22·6	20·0	19·9	4·47	3·44	2·04	2·76	2·28	1·34	0·60	0·63	2·19	2·10	1·44	2·13
14. Nottingham, 187,964 - - - - - 18·9	24·6	21·8	22·9	20·3	4·24	2·98	3·46	2·60	2·17	0·97	1·33	0·56	2·07	2·01	2·12	2·05
Group III.																
(D.) **Seven towns.** 1,145,488 - - - 37·69	27·81	25·45	23·72	23·70	5·700	4·372	3·363	3·285	2·591	1·787	1·060	0·957	3·118	2·585	2·303	2·327
15. Sunderland, 117,048 - - - - - 42·3	26·4	23·5	24·0	21·6	6·48	4·73	4·00	2·74	3·97	2·34	1·63	0·64	2·51	2·39	2·37	2·10
16. Portsmouth, 128,372 - - - - - 28·6	20·4	19·7	19·4	18·6	4·09	3·34	3·02	2·44	2·27	1·56	1·43	0·79	1·73	1·78	1·60	1·65
17. Newcastle, 145,811 - - - - - 27·1	29·1	23·6	23·2	21·8	6·01	3·44	3·48	2·27	3·57	1·57	1·33	0·58	2·44	1·87	2·15	1·68
18. Salford, 177,762 - - - - - - 34·4	28·4	24·1	23·5	25·6	6·40	5·26	3·76	4·77	2·29	2·21	1·00	1·67	4·11	3·05	2·76	3·10
19. Manchester, 341,173 - - - - - 79·5	30·6	28·6	26·5	27·7	5·80	4·42	3·26	3·82	2·17	1·65	0·78	1·16	3·63	2·76	2·49	2·66
20. Oldham, 112,176 - - - - - - 24·0	27·3	22·1	23·9	23·9	4·95	3·40	2·47	2·99	2·73	1·62	0·72	0·87	2·22	1·78	1·75	2·12
21. Leicester, 123,146 - - - - - 38·5	26·3	23·4	21·1	20·0	5·85	4·24	3·45	2·76	2·02	1·09	0·98	0·43	3·83	3·15	2·47	2·33
22. Bolton, 87,822 - - - - - - 36·5	..	..	..	23·0	..	..	..	3·55	..	..	..	0·79	..	..	..	2·76
23. Blackburn, 92,385 - - - - - 13·2	..	..	..	25·5	..	..	..	4·04	..	..	..	1·27	..	..	..	2·77
24. Derby, 79,089 - - - - - - 22·9	..	..	..	18·4	..	..	..	2·17	..	..	..	0·53	..	..	..	1·64
25. Preston, 93,932 - - - - - 25·2	..	..	..	27·3	..	..	..	4·99	..	..	..	1·06	..	..	..	3·93
26. Huddersfield, 86,427 - - - - - 8·2	..	..	..	19·8	..	..	..	1·94	..	..	..	0·59	..	..	..	1·35
27. Birkenhead, 82,103 - - - - - 21·3	..	..	..	20·2	..	..	..	2·65	..	..	..	0·85	..	..	..	1·80
28. Halifax, 86,010 - - - - - 22·8	..	..	..	21·5	..	..	..	1·57	..	..	..	0·54	..	..	..	1·03
(E.) **Seven added towns.** 607,828 - - 17·53	..	..	..	22·49	..	..	..	3·102	..	..	..	0·831	..	..	..	2·271
(F.) **Group III. as a whole.** 1,753,316 - - 26·95	..	..	..	23·27	..	..	..	3·220	..	..	..	0·913	..	..	..	2·307
(H.) **Twenty-eight towns.** 8,313,709 - - 34·34	..	..	..	21·27	..	..	..	2·921	..	..	..	0·778	..	..	..	2·142

Table XII., Part II.—COMPARISON OF FOUR QUINQUENNIA.

Table giving for the large Towns of England and for the specified Groups, the Mean Death Rates in each of four Quinquennia, 1871–75, 1876–80, 1881–85, 1886–90.

Part II.—Small Pox, Scarlet Fever, Diphtheria, "Fever" (chiefly Enteric).

Large Towns with their Population and Number of Persons to an Acre in 1881.	Small Pox.				Scarlet Fever.				Diphtheria.				"Fever."			
	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.
(G.) Twenty towns, 7,610,217 — 37·67	0·635	0·200	0·151	0·023	0·820	0·777	0·507	0·317	0·103	0·113	0·169	0·228	0·610	0·380	0·307	0·210
GROUP I.																
(A.) Towns 1—10, 6,004,693 — 40·86	0·625	0·225	0·177	0·027	0·774	0·715	0·511	0·309	0·109	0·119	0·179	0·234	0·572	0·367	0·300	0·187
1. London, 3,831,719 — 50·8	0·60	0·32	0·24	0·00	0·57	0·63	0·43	0·24	0·11	0·13	0·22	0·30	0·44	0·32	0·26	0·17
(I.) Nine Provincial towns, 2,172,974 — 30·34	0·661	0·074	0·056	0·071	1·123	0·874	0·662	0·425	0·114	0·101	0·103	0·121	0·795	0·455	0·364	0·229
2. Bristol, 207,522 — 46·6	0·38	0·03	0·01	0·04	0·75	0·69	0·31	0·38	0·09	0·04	0·08	0·09	0·52	0·40	0·20	0·15
3. Wolverhampton, 75,963 — 22·4	1·36	—	0·04	—	0·79	1·05	0·48	0·14	0·07	0·08	0·06	0·11	0·72	0·26	0·15	0·17
4. Birmingham, 402,314 — 47·9	0·72	0·01	0·10	0·00	1·20	0·97	0·44	0·22	0·22	0·16	0·12	0·14	0·55	0·31	0·18	0·14
5. Liverpool, 554,073 — 106·3	0·82	0·26	0·08	0·01	1·36	0·98	0·59	0·65	0·11	0·11	0·13	0·17	1·01	0·61	0·67	0·34
6. Sheffield, 285,619 — 14·5	0·83	0·00	0·03	0·44	1·38	1·36	0·88	0·63	0·06	0·09	0·05	0·10	0·97	0·62	0·26	0·22
7. Hull, 155,122 — 42·7	0·49	0·00	0·06	0.02	0·90	0·34	1·41	0·19	0·05	0·07	0·08	0·06	1·06	0·46	0·37	0·18
8. Plymouth, 73,925 — 53·0	0·79	0·00	0·01	0·00	0·18	0·32	0·06	0·81	0·15	0·27	0·12	0·21	0·55	0·42	0·28	0·29
9. Brighton, 107,953 — 45·9	0·15	0·02	0·03	—	0·40	0·38	0·40	0·11	0·11	0·05	0·09	0·18	0·32	0·16	0·24	0·13
10. Leeds, 310,483 — 14·4	0·35	0·00	0·03	0·01	1·31	0·77	0·99	0·36	0·08	0·06	0·11	0·05	0·88	0·42	0·38	0·28
11. Cardiff, 95,664 — 17·7	..	..	..	0·03	..	..	..	0·15	..	..	..	0·11	..	..	..	0·29
(K.) Ten Provincial towns, 2,268,638 — 29·45	..	..	..	0·069	..	..	..	0·412	..	..	..	0·120	..	..	..	0·233
(B.) Group I. as a whole, 6,100,357 — 40·04	..	..	..	0·027	..	..	..	0·306	..	..	..	0·232	..	..	..	0·189
GROUP II.																
(C.) Group II. as a whole, 460,036 — 18·66	0·643	0·006	0·028	0·007	0·821	0·790	0·491	0·210	0·058	0·075	0·088	0·090	0·732	0·350	0·292	0·258
12. Bradford, 184,035 — 25·5	0·15	0·01	0·01	0·00	1·29	0·90	0·32	0·32	0·07	0·11	0·05	0·04	0·76	0·35	0·23	0·18
13. Norwich, 88,037 — 11·8	1·39	0·01	0·00	—	0·25	0·86	0·19	0·16	0·07	0·09	0·07	0·22	0·57	0·38	0·34	0·25
14. Nottingham, 187,964 — 18·9	0·78	0·00	0·06	0·01	0·52	0·62	0·80	0·12	0·03	0·02	0·14	0·07	0·84	0·33	0·33	0·34
GROUP III.																
(D.) Seven towns, 1,145,488 — 37·69	0·686	0·135	0·065	0·008	1·052	1·098	0·497	0·398	0·086	0·097	0·146	0·250	0·766	0·456	0·352	0·301
15. Sunderland, 117,048 — 42·3	1·83	0·00	0·25	0·00	1·04	1·79	0·84	0·27	0·12	0·09	0·12	0·09	0·98	0·46	0·41	0·28
16. Portsmouth, 128,372 — 28·6	1·04	0·00	0·00	0·01	0·22	0·86	0·15	0·12	0·15	0·07	0·64	0·27	0·86	0·63	0·64	0·39
17. Newcastle, 145,811 — 27·1	1·29	0·00	0·19	0·00	1·43	1·07	0·62	0·18	0·08	0·06	0·08	0·19	0·76	0·43	0·44	0·21
18. Salford, 177,762 — 34·4	0·48	0·57	0·01	—	0·97	1·03	0·49	0·75	0·10	0·09	0·11	0·48	0·73	0·52	0·39	0·45
19. Manchester, 341,173 — 79·5	0·22	0·14	0·03	0·01	1·14	1·00	0·42	0·55	0·05	0·11	0·06	0·29	0·76	0·41	0·25	0·31
20. Oldham, 112,176 — 24·0	0·20	0·06	0·03	0·02	1·88	1·13	0·38	0·45	0·08	0·10	0·08	0·22	0·57	0·33	0·24	0·18
21. Leicester, 123,146 — 38·5	0·66	0·00	0·00	—	0·63	0·68	0·70	0·13	0·08	0·10	0·08	0·08	0·65	0·30	0·19	0·22
22. Bolton, 87,822 — 36·5	..	..	..	0·00	..	..	..	0·40	..	..	..	0·13	..	..	..	0·26
23. Blackburn, 92,385 — 13·2	..	..	..	0·03	..	..	..	0·91	..	..	..	0·02	..	..	..	0·31
24. Derby, 79,089 — 22·9	..	..	..	0·00	..	..	..	0·15	..	..	..	0·11	..	..	..	0·25
25. Preston, 93,932 — 25·2	..	..	..	0·10	..	..	..	0·28	..	..	..	0·20	..	..	..	0·47
26. Huddersfield, 86,427 — 8·2	..	..	..	0·01	..	..	..	0·27	..	..	..	0·17	..	..	..	0·14
27. Birkenhead, 82,163 — 21·3	..	..	..	0·00	..	..	..	0·41	..	..	..	0·11	..	..	..	0·33
28. Halifax, 86,010 — 22·8	..	..	..	0·00	..	..	..	0·23	..	..	..	0·13	..	..	..	0·17
(E.) Seven added towns, 607,828 — 17·53	..	..	..	0·023	..	..	..	0·400	..	..	..	0·123	..	..	..	0·285
(F.) Group III. as a whole, 1,753,316 — 26·95	..	..	..	0·013	..	..	..	0·399	..	..	..	0·206	..	..	..	0·296
(H.) Twenty-eight towns, 8,313,709 — 34·34	..	..	..	0·023	..	..	..	0·321	..	..	..	0·218	..	..	..	0·216

TABLE XII., PART III.—COMPARISON OF FOUR QUINQUENNIA.

TABLE giving for the LARGE TOWNS of ENGLAND, and for the specified Groups, the MEAN DEATH RATES in each of four Quinquennia, 1871–75, 1876–80, 1881–85, 1886–90.

PART III.—MEASLES, WHOOPING COUGH, DIARRHŒA.

Large Towns, with their Population and Number of Persons to an Acre in 1881.	Measles.				Whooping Cough.				Diarrhœa.			
	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.	1871-75.	1876-80.	1881-85.	1886-90.
(G.) **Twenty towns.** 7,610,217 - - 37·67	0·509	0·520	0·617	0·635	0·731	0·783	0·654	0·597	1·387	1·067	0·865	0·904
GROUP I.												
(A.) **Towns 1–10.** 6,004,693 - - 40·86	0·503	0·525	0·620	0·631	0·753	0·811	0·684	0·618	1·294	1·017	0·825	0·855
1. London, 3,831,719 - - 50·8	0·50	0·53	0·64	0·63	0·79	0·85	0·71	0·67	1·05	0·85	0·73	0·75
(I.) **Nine Provincial towns.** 2,172,974 - 30·34	0·512	0·524	0·584	0·627	0·688	0·758	0·638	0·521	1·733	1·328	0·994	1·041
2. Bristol, 207,522 - - - 46·6	0·43	0·41	0·40	0·55	0·45	0·64	0·50	0·52	0·81	0·80	0·52	0·48
3. Wolverhampton, 75,963 - - - 22·4	0·26	0·31	0·42	0·62	0·65	0·58	0·46	0·46	1·32	1·21	0·97	1·11
4. Birmingham, 402,314 - - - 47·9	0·48	0·37	0·43	0·63	0·81	0·84	0·69	0·56	1·98	1·45	1·14	1·20
5. Liverpool, 554,073 - - - 106·3	0·74	0·78	1·14	0·87	0·86	0·95	0·81	0·61	1·89	1·38	1·05	1·11
6. Sheffield, 285,619 - - - - 14·5	0·44	0·38	0·44	0·55	0·66	0·75	0·61	0·50	1·85	1·36	1·04	1·14
7. Hull, 155,123 - - - - 42·7	0·35	0·45	0·28	0·38	0·54	0·57	0·48	0·40	1·82	1·79	1·12	0·99
8. Plymouth, 73,925 - - - - 53·0	0·78	1·42	0·46	0·57	0·63	0·75	0·59	0·38	1·11	0·89	0·47	0·70
9. Brighton, 107,053 - - - 45·9	0·29	0·25	0·49	0·34	0·43	0·47	0·54	0·48	1·16	0·85	0·60	0·75
10. Leeds, 310,483 - - - - 14·4	0·42	0·45	0·33	0·61	0·62	0·65	0·55	0·46	2·10	1·49	1·12	1·15
11. Cardiff, 95,664 - - - 17·7	..	..	..	0·47	..	..	..	0·41	..	..	..	0·83
(K.) **Ten Provincial towns.** 2,368,638 - 29·45	..	..	..	0·621	..	..	..	0·517	..	..	..	1·035
(B.) **Group I. as a whole.** 6,100,357 - 40·04	..	..	..	0·628	..	..	..	0·615	..	..	..	0·855
GROUP II.												
(C.) **Group II. as a whole.** 460,036 - - 18·66	0·365	0·436	0·421	0·546	0·527	0·515	0·440	0·494	1·464	1·077	0·963	1·025
12. Bradford, 184,035 - - - 25·5	0·48	0·42	0·41	0·68	0·63	0·60	0·47	0·45	1·51	0·97	0·81	0·93
13. Norwich, 88,037 - - - - 11·8	0·22	0·25	0·38	0·43	0·65	0·51	0·25	0·55	1·33	1·34	0·82	1·16
14. Nottingham, 187,964 - - - 18·9	0·30	0·53	0·46	0·47	0·26	0·43	0·50	0·50	1·51	1·05	1·17	1·07
GROUP III.												
(D.) **Seven towns.** 1,145,488 - - - 37·69	0·581	0·520	0·686	0·689	0·684	0·733	0·580	0·533	1·844	1·332	1·037	1·104
15. Sunderland, 117,048 - - - 42·3	0·41	0·43	0·99	0·51	0·71	0·73	0·50	0·44	1·40	1·24	0·88	1·14
16. Portsmouth, 128,372 - - - - 28·6	0·38	0·40	0·52	0·36	0·36	0·45	0·33	0·40	0·98	0·92	0·75	0·89
17. Newcastle, 145,811 - - - 27·1	0·35	0·24	0·79	0·43	0·54	0·59	0·47	0·53	1·55	1·05	0·89	0·72
18. Salford, 177,762 - - - - 34·4	1·03	0·70	0·70	0·86	0·90	0·81	0·74	0·68	2·18	1·54	1·32	1·55
19. Manchester, 341,173 - - - 79·5	0·69	0·55	0·77	0·96	0·83	0·90	0·73	0·58	2·10	1·29	0·99	1·12
20. Oldham, 112,176 - - - - 24·0	0·50	0·48	0·58	0·84	0·58	0·56	0·50	0·64	1·13	0·74	0·67	0·64
21. Leicester, 123,146 - - - 38·5	0·37	0·57	0·30	0·43	0·50	0·45	0·51	0·31	2·95	2·13	1·67	1·59
22. Bolton, 87,822 - - - - 36·5	..	..	..	0·94	..	..	..	0·60	..	..	..	1·22
23. Blackburn, 92,385 - - - 13·2	..	..	..	1·15	..	..	..	0·50	..	..	..	1·12
24. Derby, 79,089 - - - - 22·9	..	..	..	0·55	..	..	..	0·44	..	..	..	0·65
25. Preston, 93,932 - - - - 25·2	..	..	..	1·11	..	..	..	0·70	..	..	..	2·12
26. Huddersfield, 86,427 - - - 8·2	..	..	..	0·59	..	..	..	0·39	..	..	..	0·37
27. Birkenhead, 82,163 - - - - 21·3	..	..	..	0·59	..	..	..	0·44	..	..	..	0·78
28. Halifax, 86,010 - - - 22·8	..	..	..	0·53	..	..	..	0·22	..	..	..	0·29
(E.) **Seven added towns.** 607,828 - - 17·53	..	..	..	0·807	..	..	..	0·483	..	..	..	0·981
(F.) **Group III. as a whole.** 1,753,316 - 26·95	..	..	..	0·730	..	..	..	0·516	..	..	..	1·061
(H.) **Twenty-eight towns.** 8,313,709 - 34·34	..	..	..	0·646	..	..	..	0·587	..	..	..	0·910

TABLE XIII.—CONTRAST OF PERIODS OF FOUR YEARS EACH, 1882–85, and 1886–89.

TABLE giving for the Twenty-eight LARGE TOWNS OF ENGLAND, and for the Specified Groups, in two Periods of Four Years each, namely, 1882–85, and 1886–89, the Mean Death Rates, General, Total Zymotic, Notifiable Zymotic, Non-notifiable Zymotic, and Zymotic further differentiated into its Seven Principal Elements.

N.B.—At the beginning of the first period of Four Years, Five of the Fourteen Towns of Group III. were as yet under no System of Notification, but the whole Group was under the Dual System from beginning to end of the Second Four Years.

Large Towns and Number of Persons to an Acre in 1881.	All Causes.		Total Zymotic.		Notifiable Zymotic.		Non-Notifiable Zymotic.		Small-pox.		Scarlet Fever.		Diphtheria.		"Fever."		Measles.		Whooping Cough.		Diarrhœa.	
	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.	1882-85.	1886-89.
(G.) **Twenty Towns** - 37·67	21·88	20·75	3·249	2·901	1·056	0·769	2·193	2·133	0·107	0·028	0·469	0·311	0·175	0·218	0·306	0·212	0·634	0·623	0·675	0·584	0·883	0·926
GROUP I.																						
(A.) **Towns 1—10** - - 40·86	21·53	20·26	3·243	2·832	1·082	0·753	2·160	2·078	0·120	0·033	0·478	0·303	0·190	0·227	0·296	0·190	0·612	0·606	0·714	0·595	0·834	0·878
1. London - - - 50·8	20·8	19·7	3·14	2·73	1·03	0·71	2·11	2·02	0·15	0·00	0·40	0·25	0·23	0·29	0·25	0·17	0·64	0·60	0·76	0·65	0·72	0·78
(I.) **Nine Provincial Towns** - 30·34	22·77	21·51	3·421	3·031	1·173	0·833	2·248	2·198	0·063	0·089	0·627	0·392	0·111	0·119	0·372	0·234	0·572	0·627	0·633	0·507	1·043	1·065
2. Bristol - - - 46·6	19·1	19·3	1·97	2·23	0·49	0·74	1·49	1·50	0·01	0·05	0·20	0·44	0·08	0·10	0·18	0·14	0·36	0·58	0·58	0·43	0·54	0·49
3. Wolverhampton - - 22·4	21·9	21·5	2·68	2·79	0·68	0·44	2·01	2·35	0·05	—	0·42	0·14	0·06	0·12	0·15	0·18	0·52	0·67	0·44	0·49	1·05	1·19
4. Birmingham - - 47·9	21·2	20·1	3·20	2·86	0·89	0·44	2·32	2·42	0·13	0·00	0·45	0·16	0·12	0·14	0·19	0·15	0·46	0·60	0·64	0·58	1·22	1·24
5. Liverpool - - - 106·3	26·8	25·3	4·46	3·66	1·47	1·08	2·99	2·58	0·09	0·02	0·54	0·54	0·15	0·16	0·70	0·37	1·09	0·83	0·83	0·59	1·09	1·16
6. Sheffield - - - 14·5	22·1	21·3	3·47	3·59	1·40	1·44	2·06	2·15	0·04	0·56	1·03	0·58	0·06	0·09	0·28	0·22	0·37	0·51	0·58	0·51	1·11	1·14
7. Hull - - - 42·7	20·9	18·4	3·22	2·32	1·17	0·46	2·05	1·86	0·07	0·03	0·64	0·21	0·10	0·05	0·37	0·18	0·34	0·46	0·54	0 41	1·18	1·00
8. Plymouth - - - 53·0	21·0	22·5	2·11	3·06	0·48	1·44	1·63	1·62	0·00	—	0·07	0·93	0·13	0·22	0·28	0·30	0·51	0·54	0·62	0·39	0·51	0·69
9. Brighton - - - 45·9	19·4	17·2	2·45	1·84	0·65	0·44	1·81	1·41	0·02	—	0·33	0·11	0·10	0·19	0·20	0·13	0·57	0·29	0·60	0·38	0·64	0·73
10. Leeds - - - 14·4	22·7	21·4	3·66	3·05	1·72	0·72	1·94	2·33	0·04	0·01	1·18	0·38	0·13	0·05	0·39	0·28	0·31	0·69	0·48	0·45	1·14	1·19
11. Cardiff - - - 17·7	21·4	18·6	3·68	2·35	1·35	0·62	2·34	1·73	0·03	0·04	0·69	0·15	0·30	0·11	0·33	0·33	0·82	0·47	0·59	0·44	0·93	0·82
(K.) **Ten Provincial towns** - 29·45	22·75	21·45	3·440	3·009	1·183	0·825	2·257	2·184	0·062	0·086	0·631	0·382	0·120	0·118	0·371	0·239	0·585	0·621	0·633	0·505	1·039	1·057
(B.) **Group I. as a whole** - 40·04	21·54	20·26	3·251	2·826	1·087	0·751	2·165	2·075	0·118	0·033	0·481	0·301	0·191	0·225	0·296	0·192	0·616	0·604	0·713	0·594	0·836	0·877
GROUP II.																						
(C.) **Group II. as a whole** - 18·66	21·59	20·48	2·718	2·694	0·761	0·583	1·957	2·110	0·032	0·008	0·322	0·222	0·100	0·088	0·307	0·265	0·495	0·535	0·442	0·529	1·020	1·047
12. Bradford - - - 25·5	20·9	20·9	2·38	2·60	0·54	0·57	1·85	2·03	0·01	0·00	0·24	0·35	0·05	0·05	0·24	0·18	0·50	0·59	0·45	0·50	0·91	0·94
13. Norwich - - - 11·8	20·1	19·9	2·13	2·73	0·52	0·64	1·62	2·09	0·00	—	0·06	0·19	0·08	0·21	0·38	0·24	0·44	0·46	0·31	0·48	0·87	1·17
14. Nottingham - - 18·9	23·0	20·5	3·33	2·79	1·10	0·57	2·22	2·23	0·07	0·02	0·53	0·12	0·16	0·08	0·34	0·36	0·53	0·53	0·51	0·58	1·19	1·12
GROUP III.																						
(D.) **Seven towns** - - 37·69	23·97	23·25	3·502	3·332	1·043	0·921	2·460	2·411	0·075	0·010	0·483	0·386	0·122	0·223	0·362	0·303	0·810	0·743	0·566	0·550	1·083	1·119
15. Sunderland - - 42·3	24·9	21·1	4·32	2·77	1·65	0·56	2·66	2·22	0·31	0·00	0·75	0·20	0·13	0·09	0·45	0·26	1·23	0·60	0·53	0·44	0·91	1·17
16. Portsmouth - - 28·6	19·3	18·8	2·93	2·64	1·22	0·81	1·71	1·83	0·00	0·01	0·14	0·12	0·40	0·27	0·69	0·41	0·63	0·45	0·29	0·45	0·80	0·94
17. Newcastle - - - 27·1	23·6	21·5	3·69	2·39	1·44	0·58	2·25	1·81	0·22	0·00	0·70	0·20	0·09	0·17	0·44	0·21	0·93	0·53	0·48	0·55	0·86	0·73
18. Salford - - - 34·4	23·7	25·1	3·97	4·78	1·01	1·58	2·96	3·20	0·01	—	0·49	0·79	0·11	0·34	0·40	0·45	0·83	0·94	0·70	0·63	1·44	1·63
19. Manchester - - - 79·5	26·8	27·0	3·50	3·77	0·83	1·09	2·67	2·68	0·04	0·02	0·46	0·50	0·07	0·26	0·26	0·31	0·87	0·96	0·74	0·63	1·06	1·10
20. Oldham - - - 24·0	24·2	23·9	2·52	3·17	0·59	0·99	1·94	2·17	0·02	0·03	0·28	0·52	0·08	0·26	0·21	0·19	0·70	0·88	0·55	0·65	0·69	0·65
21. Leicester - - - 38·5	20·9	20·1	3·28	2·86	0·83	0·41	2·45	2·46	0·00	—	0·57	0·11	0·08	0·08	0·18	0·23	0·36	0·49	0·39	0·36	1·70	1·61
22. Bolton - - 36·5	22·5	22·2	3·25	3·50	0·49	0·77	2·75	2·73	0·05	0·00	0·12	0·38	0·06	0·12	0·27	0·26	0·74	0·97	0·64	0·52	1·39	1·25
23. Blackburn - - - 13·2	24·2	25·8	3·51	4·50	0·98	1·44	2·53	3·06	0·00	0·04	0·37	1·08	0·01	0·02	0·59	0·31	0·69	1·40	0·54	0 58	1·31	1·08
24. Derby - - - 22·9	18·8	18·0	1·94	1·98	0·66	0·53	1·28	1·45	0·01	0·00	0·31	0·16	0·02	0·09	0·32	0·27	0·34	0·37	0·37	0·39	0·58	0·69
25. Preston - - - 25·2	26·7	27·4	4·76	5·17	1·21	1·16	3·55	4·01	0·01	0·13	0·59	0·30	0·11	0·22	0·50	0·52	0·49	1·21	0·60	0·79	2·46	2·02
26. Huddersfield - - 8·2	20·8	20·0	1·91	2·12	0·35	0·64	1·56	1·48	0·00	0·01	0·14	0·32	0·05	0·20	0·17	0·12	0·54	0·73	0·53	0·39	0·49	0·37
27. Birkenhead - - 21·3	20·2	19·9	2·39	2·60	0·71	0·88	1·68	1·72	0·04	0·01	0·28	0·47	0·07	0·11	0·33	0·30	0·54	0·50	0·55	0·44	0·60	0·78
28. Halifax - - - 22·8	20·9	21·2	1·57	1·63	0·69	0·52	0·88	1·11	0·01	0·00	0·31	0·22	0·06	0·12	0·32	0·17	0·23	0·58	0·25	0·22	0·40	0·31
(E.) **Seven added towns** - 17·53	22·23	22·24	2·869	3·186	0·738	0·876	2·131	2·309	0·017	0·028	0·305	0·439	0·054	0·123	0·363	0·287	0·523	0·854	0 505	0·487	1·097	0·969
(F.) **Group III. as a whole** - 26·95	23·35	22·89	3·277	3·280	0·934	0·906	2·342	2·375	0·054	0·016	0·420	0·405	0·098	0·188	0·362	0·297	0·710	0·781	0·544	0·528	1·088	1·067
(H.) **Twenty-eight towns** - 34·34	21·93	20·85	3·227	2·918	1·036	0·775	2·191	2·142	0·099	0·028	0·459	0·319	0·167	0·209	0·311	0·219	0·629	0·639	0·662	0·575	0·900	0·928

TABLE XIV.—MEAN DEATH-RATES IN YEARLY DESCENDING QUINQUENNIA

TABLE giving for certain specified GROUPS of LARGE TOWNS, the MEAN DEATH-RATES, in Yearly Descending Quinquennia.—General, Total Zymotic, Notifiable Zymotic, Non-Notifiable Zymotic, and Notifiable Zymotic further differentiated into Small-Pox, Scarlet Fever, Diphtheria, "Fever."

	1871-75.	1872-76.	1873-77.	1874-78.	1875-79.	1876-80.	1877-81.	1878-82.	1879-83.	1880-84.	1881-85.	1882-86.	1883-87.	1884-88.	1885-89.	1886-90.
GENERAL.																
(A.) London and Nine Provincial Towns of Group I.	24·19	23·60	23·49	23·54	23·37	22·89	22·63	22·59	22·13	21·85	21·54	21·42	21·21	20·81	20·32	20·73
(I.) The Nine Provincial Towns	26·59	25·93	25·61	25·54	24·83	24·18	23·72	23·59	23·10	23·02	22·67	22·61	22·45	21·85	21·47	22·00
(D.) Seven Towns of Group III.	27·81	27·22	26·75	26·44	25·92	25·45	24·70	24·59	24·19	24·01	23·72	23·89	23·90	23·55	23·32	23·70
TOTAL ZYMOTIC.																
(A.) London and Nine Provincial Towns of Group I.	4·630	4·130	3·938	4·065	3·852	3·778	3·710	3·714	3·436	3·511	3·295	3·169	3·105	3·011	2·812	2·861
(I.) The Nine Provincial Towns	5·626	5·096	4·711	4·833	4·238	4·115	3·905	3·885	3·564	3·715	3·400	3·350	3·308	3·093	2·938	3·034
(D.) Seven Towns of Group III.	5·700	5·260	4·772	4·670	4·324	4·372	3·888	3·917	3·589	3·661	3·363	3·456	3·485	3·381	3·348	3·285
NOTIFIABLE ZYMOTIC.																
(A.) London and Nine Provincial Towns of Group I.	2·080	1·642	1·588	1·679	1·524	1·426	1·443	1·381	1·298	1·263	1·166	0·992	0·918	0·827	0·755	0·757
(I.) The Nine Provincial Towns	2·693	2·306	2·057	2·090	1·679	1·506	1·424	1·409	1·297	1·272	1·185	1·091	1·020	0·865	0·804	0·846
(D.) Seven Towns of Group III.	2·591	2·311	1·980	1·893	1·820	1·787	1·508	1·441	1·313	1·211	1·060	1·007	0·974	0·930	0·911	0·957
NON-NOTIFIABLE ZYMOTIC.																
(A.) London and Nine Provincial Towns of Group I.	2·550	2·488	2·350	2·386	2·328	2·352	2·267	2·332	2·138	2·247	2·129	2·177	2·187	2·183	2·057	2·103
(I.) The Nine Provincial Towns	2·933	2·790	2·654	2·744	2·559	2·610	2·481	2·476	2·266	2·444	2·215	2·260	2·289	2·228	2·134	2·189
(D.) Seven Towns of Group III.	3·109	2·949	2·792	2·776	2·504	2·585	2·379	2·476	2·276	2·451	2·303	2·449	2·511	2·452	2·438	2·327
SMALL-POX.																
(A.) London and Nine Provincial Towns of Group I.	0·625	0·246	0·201	0·226	0·272	0·225	0·264	0·180	0·140	0·161	0·177	0·097	0·090	0·095	0·058	0·027
(I.) The Nine Provincial Towns	0·661	0·389	0·208	0·179	0·104	0·074	0·038	0·014	0·028	0·049	0·056	0·054	0·073	0·099	0·079	0·071
(D.) Seven Towns of Group III.	0·686	0·359	0·162	0·147	0·144	0·135	0·037	0·021	0·039	0·056	0·065	0·061	0·048	0·034	0·017	0·008
SCARLET FEVER.																
(A.) London and Nine Provincial Towns of Group I.	0·774	0·778	0·796	0·871	0·773	0·715	0·706	0·722	0·684	0·618	0·511	0·430	0·392	0·319	0·286	0·309
(I.) The Nine Provincial Towns	1·123	1·109	1·102	1·203	0·951	0·874	0·883	0·900	0·787	0·735	0·662	0·573	0·527	0·399	0·372	0·425
(D.) Seven Towns of Group III.	1·052	1·175	1·090	1·055	1·063	1·098	0·940	0·888	0·769	0·648	0·497	0·466	0·460	0·422	0·384	0·398
DIPHTHERIA.																
(A.) London and Nine Provincial Towns of Group I.	0·109	0·106	0·105	0·114	0·120	0·119	0·127	0·144	0·153	0·166	0·179	0·189	0·193	0·202	0·219	0·234
(I.) The Nine Provincial Towns	0·114	0·104	0·099	0·101	0·099	0·101	0·100	0·098	0·092	0·095	0·103	0·116	0·121	0·121	0·120	0·121
(D.) Seven Towns of Group III.	0·086	0·086	0·089	0·097	0·099	0·097	0·131	0·145	0·142	0·143	0·146	0·124	0·130	0·157	0·202	0·250
"FEVER."																
(A.) London and Nine Provincial Towns of Group I.	0·572	0·513	0·485	0·459	0·409	0·367	0·346	0·336	0·321	0·319	0·300	0·276	0·243	0·211	0·191	0·187
(I.) The Nine Provincial Towns	0·795	0·704	0·648	0·606	0·524	0·455	0·403	0·396	0·390	0·393	0·364	0·347	0·298	0·245	0·233	0·229
(D.) Seven Towns of Group III.	0·766	0·691	0·637	0·593	0·513	0·456	0·399	0·387	0·362	0·363	0·352	0·357	0·335	0·317	0·308	0·301

Table XV.—Proportion of Zymotic to Total Deaths in 20 large Towns as a whole during four Quinquennia.

Table giving for the Twenty large Towns or Group (G.), the actual number of Deaths from all Causes, and also from the seven principal Zymotic Diseases in each of the 20 Years 1871-90, and the Average Proportions of the several kinds to the Total Deaths in each of the four Quinquennia, and in the whole Period.

	All Causes.	Total Zymotic.	Notifiable Zymotic.	Non-notifiable Zymotic.	Small Pox.	Scarlet Fever.	Diphtheria.	Fever.	Measles.	Whooping Cough.	Diarrhœa.
1871	170,153	41,719	23,377	18,342	13,348	4,398	672	4,959	3,604	4,411	10,327
1872	154,716	31,529	13,369	18,160	5,521	3,374	579	3,895	3,135	5,860	9,165
1873	161,597	26,318	8,900	17,418	505	3,881	616	3,898	3,908	4,097	9,413
1874	167,808	30,060	13,884	16,176	870	8,416	716	3,882	3,617	4,065	8,494
1875	171,823	29,540	12,265	17,275	427	7,378	840	3,620	2,631	5,933	8,711
1871-75	826,097	159,166	71,795	87,371	20,671	27,447	3,423	20,254	16,895	24,366	46,110
Proportions in the first quinquennium	**1,000**	**193**	**87**	**106**	**25**	**33**	**4**	**25**	**20**	**30**	**56**
1876	163,442	28,176	11,019	17,157	1,700	5,536	633	3,150	4,031	4,591	8,535
1877	160,102	24,818	10,452	14,366	3,041	3,792	642	2,977	3,763	4,750	5,853
1878	175,174	31,846	11,793	20,053	1,433	6,290	989	3,081	2,986	7,458	9,609
1879	173,760	23,940	9,932	14,008	461	6,307	970	2,194	4,336	5,512	4,160
1880	169,382	30,124	9,902	20,222	485	6,263	873	2,281	3,067	6,059	10,496
1876-80	841,860	138,904	53,098	85,806	7,120	28,188	4,107	13,683	18,783	28,370	38,653
Proportions in the second quinquennium	**1,000**	**165**	**63**	**102**	**8**	**33**	**5**	**16**	**22**	**34**	**46**
1881	164,854	25,476	10,962	14,514	2,463	5,017	1,106	2,376	4,179	4,312	6,023
1882	171,741	27,689	9,108	18,581	650	4,388	1,275	2,795	5,029	7,171	6,381
1883	169,445	22,829	9,069	13,760	412	4,657	1,336	2,664	4,179	3,650	5,931
1884	174,834	28,497	8,570	19,927	1,243	3,617	1,442	2,268	4,816	5,400	9,711
1885	165,731	22,104	6,097	16,007	1,044	1,895	1,378	1,780	5,755	4,778	5,474
1881-85	846,605	126,595	43,806	82,789	5,812	19,574	6,537	11,883	23,958	25,311	33,520
Proportions in the third quinquennium	**1,000**	**150**	**52**	**98**	**7**	**23**	**8**	**14**	**28**	**30**	**40**
1886	171,966	23,582	5,340	18,242	65	2,109	1,356	1,810	4,145	4,523	9,574
1887	174,037	27,089	6,766	20,323	316	3,189	1,502	1,759	6,645	5,330	8,348
1888	163,340	20,567	6,369	14,198	532	2,277	1,896	1,664	4,043	5,088	5,067
1889	165,803	23,154	6,562	16,592	7	2,552	2,338	1,665	5,444	4,057	7,091
1890	191,749	24,694	6,753	17,941	8	2,838	2,248	1,659	5,691	5,425	6,825
1886-90	866,895	119,086	31,790	87,296	928	12,965	9,340	8,557	25,968	24,423	36,905
Proportions in the fourth quinquennium	**1,000**	**137**	**37**	**100**	**1**	**15**	**11**	**10**	**30**	**28**	**43**
1871-90	3,381,457	543,751	200,489	343,262	34,531	88,174	23,407	54,377	85,604	102,470	155,188
Proportions in the whole period	**1,000**	**161**	**59**	**101**	**10**	**26**	**7**	**16**	**25**	**30**	**46**

Table XVI.—Proportion of Zymotic to Total Deaths in Groups I. and III. during the two Periods of Four Years Each.

Table giving for Group I. as a whole (B.), for the Provincial Towns of Group I. (K.), and for Group III. as a whole (F.) the Actual Number of Deaths in each Year 1882–89, the Proportion of Zymotic to Total Deaths in each of the Two Periods of Four Years 1882–85 and 1886–89, and the Proportion Per Cent. of the latter to the former, as regards the Actual Number of Deaths in each Period.

	Population.	All Causes.	Total Zymotic.	Notifiable Zymotic.	Non-notifiable Zymotic.	Small-Pox.	Scarlet Fever.	Diphtheria.	Fever.	Measles.	Whooping Cough.	Diarrhœa.
(B.) Group I. as a whole.												
1882	6,136,643	134,926	21,806	7,340	14,466	513	3,545	1,080	2,202	3,590	6,203	4,673
1883	6,195,445	133,633	18,680	7,627	11,053	298	4,019	1,196	2,114	3,483	2,972	4,598
1884	6,255,127	137,510	22,693	7,219	15,744	1,149	2,992	1,288	1,790	3,869	4,584	7,291
1885	6,315,719	130,130	17,475	4,838	12,637	989	1,387	1,219	1,243	4,414	3,968	4,255
1882–85	24,902,934	536,199	80,924	27,024	53,900	2,949	11,943	4,783	7,349	15,356	17,727	20,817
Proportions in first four years	..	1000	151	50	101	5	22	9	14	29	33	39
1886	6,377,236	134,023	18,350	4,075	14,275	62	1,516	1,173	1,324	3,382	3,692	7,201
1887	6,439,698	135,020	20,754	5,254	15,500	317	2,454	1,238	1,245	4,702	4,413	6,385
1888	6,503,124	127,440	16,608	5,064	11,544	485	1,843	1,540	1,196	3,464	4,145	3,935
1889	6,567,527	127,783	17,394	5,065	12,329	3	1,973	1,876	1,213	4,089	3,091	5,149
1886–89	25,887,585	524,266	73,106	19,458	53,648	867	7,786	5,827	4,978	15,637	15,341	22,670
Proportions in second four years	..	1000	139	37	102	2	15	11	9	30	29	43
Proportion per cent. of latter to former	104	98	90	72	100	29	65	121	68	101	87	109
(F.) Group III. as a whole.												
1882	1,794,052	42,485	6,721	1,871	4,850	109	783	220	759	1,662	1,199	1,989
1883	1,815,418	41,993	5,034	1,745	3,289	114	762	146	723	766	786	1,737
1884	1,837,152	43,713	6,586	1,791	4,795	115	895	159	622	1,173	898	2,724
1885	1,859,278	42,377	5,581	1,409	4,172	58	625	191	535	1,585	1,092	1,495
1882–85	7,305,900	170,568	23,922	6,816	17,106	396	3,065	716	2,639	5,186	3,975	7,945
Proportions in first four years	..	1000	140	40	100	2	18	4	15	30	23	47
1886	1,922,296	44,860	6,281	1,490	4,791	6	654	221	609	1,215	992	2,584
1887	1,946,791	46,335	7,308	1,965	5,343	15	999	340	611	2,217	904	2,222
1888	1,971,689	42,642	4,916	1,784	3,132	105	750	364	565	679	1,119	1,334
1889	1,997,001	45,585	7,211	1,864	5,347	3	769	551	541	2,018	1,125	2,204
1886–89	7,837,777	179,422	25,716	7,103	18,613	129	3,172	1,476	2,326	6,129	4,140	8,344
Proportions in second four years	..	1000	143	40	104	1	18	8	13	34	23	46
Proportion per cent. of latter to former	107	105	107	104	109	33	103	206	88	118	104	105
(K.) The Provincial Towns of Group I.												
1882	2,272,932	52,021	8,253	2,925	5,328	82	1,541	217	1,085	1,261	1,556	2,511
1883	2,293,531	53,055	7,879	3,472	4,407	164	2,030	245	1,033	1,063	1,390	1,954
1884	2,314,634	54,460	9,334	2,844	6,490	236	1,548	315	745	1,584	1,396	3,510
1885	2,336,264	50,130	6,214	1,641	4,573	90	680	323	548	1,486	1,489	1,598
1882–85	9,217,361	209,666	31,680	10,882	20,798	572	5,799	1,100	3,411	5,394	5,831	9,573
Proportions in first four years	..	1000	151	52	99	3	28	5	16	26	28	46
1886	2,358,434	51,747	7,229	1,816	5,413	38	828	327	623	1,304	858	3,251
1887	2,381,161	52,812	8,070	2,165	5,905	308	1,007	277	573	1,808	1,485	2,612
1888	2,404,457	48,592	5,805	1,825	3,980	476	634	239	476	1,063	1,158	1,759
1889	2,428,335	52,100	7,685	2,096	5,589	2	1,189	288	617	1,775	1,342	2,472
1886–89	9,572,387	205,251	28,789	7,902	20,887	824	3,658	1,131	2,289	5,950	4,843	10,094
Proportions in second four years	..	1000	140	39	102	4	18	6	11	29	24	49
Proportion per cent. of latter to former	104	98	91	73	100	144	63	103	67	111	83	106

TABLE XVII.—UNCERTIFIED DEATHS.

TABLE giving for the TWENTY-EIGHT LARGE TOWNS OF ENGLAND the PERCENTAGE of UNCERTIFIED (CAUSES OF) DEATHS to TOTAL DEATHS in each of the Nine Years 1882–90, these being the only years in which the Registrar-General gives them.

Large Towns and Number of Persons to an Acre in 1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
(G.) **Twenty towns** - - - 37·67	2·42	2·46	2·30	2·21	2·23	2·22	2·02	2·06	1·94
GROUP I.									
(A.) **Towns 1—10** - - - 40·86	2·14	2·24	2·11	2·06	2·05	2·01	1·94	2·03	1·94
1. London - - - - - 50·8	1·2	1·2	1·3	1·1	1·2	1·1	1·0	1·1	0·9
(I.) **Nine Provincial towns** - - 30·34	3·69	3·85	3·47	3·61	3·53	3·52	3·57	3·49	3·65
2. Bristol - - - - - 46·6	2·7	3·0	2·4	2·0	2·5	2·2	2·6	2·4	2·4
3. Wolverhampton - - - 22·4	6·5	6·8	3·8	2·6	1·8	1·5	1·5	1·5	1·2
4. Birmingham - - - - - 47·9	1·4	1·1	1·5	2·1	2·3	2·1	2·6	2·4	3·0
5. Liverpool - - - - - 106·3	4·7	5·4	4·9	4·8	5·1	5·0	5·0	5·6	6·1
6. Sheffield - - - - - 14·5	4·7	4·6	5·2	6·1	5·5	5·9	5·5	4·6	4·9
7. Hull - - - - - 42·7	5·5	5.4	5·6	5·6	4·8	4·4	5·6	4·2	3·4
8. Plymouth - - - - - 53·0	1·5	0·8	1·0	0·6	0·8	1·2	1·0	0·9	0·6
9. Brighton - - - - - 45·9	1·6	2·8	1·6	1·2	2·7	3·1	2·4	3·1	3·0
10. Leeds - - - - - 14·4	3·5	3·1	2·0	2·4	1·6	1·7	1·5	1·6	1·0
11. Cardiff - - - - 17·7	1·9	1·9	2·2	1·8	1·8	2·2	2·1	1·8	2·1
(K.) **Ten Provincial towns** - 29·45	3·63	3·79	3·41	3·52	3·45	3·46	3·51	3·42	3·58
(B.) **Group I. as a whole** - - 40·04	2·13	2·24	2·11	2·05	2·04	2·02	1·94	2·02	1·94
GROUP II.									
(C.) **Group II. as a whole** - - 18·66	2·75	2·79	2·20	1·76	2·13	2·15	1·76	1·75	1·64
12. Bradford - - - - - 25·5	4·5	3·0	2·6	2·0	2·6	2·8	2·3	1·9	1·9
13. Norwich - - - - 11·8	2·5	3·1	1·7	1·5	1·8	1·3	1·1	1·2	1·2
14. Nottingham - - - - 18·9	1·3	2·4	2·0	1·6	1·9	1·8	1·6	1·9	1·5
GROUP III.									
(D.) **Seven towns** - - - 37·69	3·63	3·39	3·24	3·08	3·08	3·11	2·48	2·29	2·06
15. Sunderland - - - - - 42·3	5·5	4·3	2·9	3·3	3·3	4·4	1·9	1·3	1·2
16. Portsmouth - - - - - 28·6	0·8	0·9	0·9	1·3	1·2	1·0	1·1	1·0	0·7
17. Newcastle - - - - - 27·1	3·2	3·6	2·9	2·9	2·9	3·0	2·2	2·2	2·3
18. Salford - - - - - 34·4	6·1	4·7	4·3	4·0	4·2	4·0	3·6	3·3	3·0
19. Manchester - - - - - 79·5	2·3	2·4	2·8	2·2	2·5	2·5	2·5	2·1	2·0
20. Oldham - - - - - 24·0	6·5	6·6	6·8	7·5	6·3	5·4	3·1	3·5	2·2
21. Leicester - - - - - 38·5	2·4	2·8	1·9	1·9	2·2	2·5	2·1	2·5	2·2
22. Bolton - - - - - 36·5	3·7	2·5	2·4	2·8	3·3	2·4	2·5	1·9	1·9
23. Blackburn - - - - 13·2	2·8	2·9	3·0	2·5	3·1	3·1	2·9	2·3	3·1
24. Derby - - - - - 22·9	1·1	2·1	1·3	1·7	2·3	1·8	1·5	1·6	0·9
25. Preston - - - - - 25·2	4·1	5·1	3·9	2·9	2·8	2·7	2·6	2·6	2·8
26. Huddersfield - - - 8·2	4·5	4·4	3·7	4·5	3·9	3·6	3·4	4·8	4·4
27. Birkenhead - - - - 21·3	1·9	2·9	4·5	3·8	1·9	2·2	1·2	1·5	1·1
28. Halifax - - - - 22·8	7·6	9·6	6·0	7·0	7·7	7·0	5·4	5·6	5·5
(E.) **Seven added towns** - - 17·53	3·62	4·06	3·51	3·42	3·47	3·15	2·75	2·79	2·73
(F.) **Group III. as a whole** - 26·95	3·63	3·62	3·33	3·20	3·21	3·13	2·57	2·46	2·28
(H.) **Twenty-eight towns** - - 34·34	2·50	2·5	2·40	2·30	2·32	2·29	2·08	2·12	2·01

immensity of mischief had been done before he had any knowledge that an epidemic was in progress. He was satisfied that the Act was a safeguard to the public. Further, the Act would lead to greater knowledge of the natural history of infectious diseases, which could not fail to be of value in the future. The uses of the Act extended beyond the isolation of the sick and the improvement of houses.

Dr. Willoughby (London) said that opponents of notification persisted in identifying it with forcible removal, and in alleging what they always *might* know, and if they had had any case in their own family *must* know, to be false, viz., that when isolation at home was practicable, removal was not enforced. He challenged them to say yes to the question, "Would they leave alone a case of virulent scarlet fever in a tailor's "workroom, or of small-pox in a washerwoman's confined lodging, each "of which he had seen?" If there were such a thing as disinfection, would they protect and defend the man who, by concealing disease in his own house, caused the death of his neighbour, from the consequences of his own selfish act? He wished Mr. Biddle to explain how knowledge of the existence of disease could check measures for its suppression; and asked how those faddists, who are at once anti-notification, anti-vaccination, and anti-everything, reconciled the extremely stringent and inquisitorial policy of the Leicester Corporation, where, however, they had not dared to experiment with unvaccinated women as nurses.

Dr. Atkinson (Surbiton) said that we were constantly being told what dual notification was going to do in the way of lessening the death-rate and finding out the natural history of infectious diseases, but what it had effected would appear to be a much more practical and important question. None of the recent important discoveries in sanitary science were due to dual notification. When he asked the advocates of the dual system what they had accomplished, and twitted them with the smallness of their gains, he was told to "possess his soul in patience—Rome was not built in a day."* No one would be so foolish as to oppose notification, if carried out in a proper manner and at the proper time; but it could never answer to put the cart before the horse, and it would never prove to be an effectual procedure to apply dual notification in any district before every house had been inspected and its sanitary defects made good. Until this was done, a certain number of lives must continue to be sacrificed, the cursory and partial examination brought about by dual notification being incapable of producing equivalent results. The two chief medical papers were in favour of dual notification, and yet the *British Medical Journal*† admitted that the amount to be paid is sometimes larger than the authorities anticipated, while at the same time there is frequently no result to be shown for this expenditure; and the *Lancet*‡ says that the Notification Act would be more triumphantly vindicated if it could be shown to keep down the number of cases to more modest proportions In Manchester, "with all our powers and appliances, it would seem we "make but little progress in the diminution of scarlet fever, typhoid fever, "and diphtheria."§ Finally, to back up these views, there was the unassailable evidence produced by Mr. Biddle.

Dr. Covernton (Ontario) described the notification system enforced in his province. The regulations were very stringent, but worked well, and without friction, and epidemic diseases were becoming stamped out.

---

* *Sanitary Record*, March 15, 1891.
† March 22, 1890.
‡ November 13, 1890.
§ *Lancet*, February 14, 1891.

Mr. T. Corbet, M.R.C.S. (Kingston-on-Thames), said that State interference with the legitimate functions of a medical man, by putting him under a penal enactment to notify infectious diseases, had not lessened the death-rate from those diseases in the manner its promoters so confidently predicted. Mr. Biddle's statistics proved this conclusively. A great deal of money had already been spent on notification without any good results being shown, even in those towns where it had been longest on its trial. Some towns which had adopted the Act in haste were repenting at leisure; Kidderminster, for example, had allowed the Act to become a dead letter. He regarded the obligation to notify on the part of the medical attendant as an infringement of personal rights and liberty. It compelled him to become a State-informer on his patients. They did not advocate the liberty to do anything wrong, but the liberty to practice their profession with honour to themselves and duty to their patients.

Dr. Vivant (Monaco) had not thought that in England any doubt remained as to the obligatory notification by the medical attendant, but what he had heard satisfied him that the dispute was far from being at an end. In France a *projet de loi* for the same purpose was in preparation, and it had occurred to Dr. Martin and himself that it would be extremely interesting to ascertain by a vote of the Section how many of the hygienists present were in favour of the principle, and how many against it.

Dr. Edward Berdoe (London) stated that in Bethnal Green he experienced no friction whatever in the working of the Notification Act, except with the owners of property where diseases occurred. Poor people were now anxious to take advantage of the means of hospital isolation, whereas before notification was made compulsory the friction with this class was often most serious. He had seen, scores of times, scarlet fever patients in bed in a room where match-boxes were being made by thousands, and had seen clothing made and lying on the bed in which the fever patient lay. In the old days he had had the greatest difficulty in getting such cases removed, but now there was none. Very often the poor people found a case of diphtheria or fever a real blessing to the household, as it led to their houses being put in a sanitary condition. He accounted for the apparent increase of diphtheria by the tendency of inexperienced medical men to err on the safe side, and to notify common sore throat as diphtheria; but the certainty that diphtheria was not overlooked was ample compensation for the expense and statistical errors involved.

Dr. Drysdale (London) gathered from his paper that Mr. Biddle preferred to leave all contagious diseases alone, and to allow them to go on uncontrolled, either by notification or segregation. This was, in his opinion, quite an untenable position. All contagious diseases, such as typhus, scarlatina, and small-pox, were spread simply and solely by contagion, and never by so-called spontaneous generation by means of overcrowding and filth. It was difficult to cure diseases such as small-pox, but they might easily be prevented by segregation of the patient. Everybody knew that young persons often escaped scarlatina, and even measles and whooping cough, when educated at home and not exposed to infection at school. Notification was only useful if it led to segregation. He held that eventually all cases of infectious disease would be segregated in houses provided in each parish or district, where the patient

would be treated by his own medical man. He was convinced that if this were done, civilisation might free itself entirely from such plagues as small-pox, typhus, scarlatina, and even from measles and whooping cough.

Dr. Gemmell (Glasgow) stated that unscrupulous medical men are capable sometimes of sending in cases of infectious diseases diagnosed wrongly for the sake of the fee. Thus, measles was often sent in as scarlet fever, because no fee was given for the former, while a fee was given for the latter. This in Dr. Gemmell's experience occurred so often, and so persistently, that the practitioners in question could only be assumed to be acting for gain, or else they were unacquainted with the very elements of their profession.

The discussion was continued by Dr. Harvey Littlejohn and Dr. Guertler.

Dr. Ewing (New York) said that compulsory notification had been in force in New York for many years without present opposition. No fees were paid to the profession, but postal cards were provided. Expert diagnosticians visited the persons reported as having infectious diseases, and the diagnosis was confirmed before removal to hospital.

Dr. Spottiswoode Cameron, in replying on the discussion on his own paper, asked permission to speak at the same time to the general question. He had had practical experience for 13 years of working with notification in Huddersfield, and he had had nearly two years of working without it in Leeds. Speaking as an advocate of notification, he was glad that Mr. Biddle had presented his case. His statistics, however, were not strictly comparable. Mr. Biddle compared, for instance, towns without any fever hospital accommodation at all with others in which an attempt at isolation had been carried out for years. He also told them nothing about the varying systems of house inspection existing in these different towns. Although Dr. Cameron was an advocate for notification, if he had to make his choice between an efficient house-to-house inspection in his town, and the compulsory notification of infectious disease, he would unhesitatingly choose the former; but Mr. Biddle said nothing about the efficiency or non-efficiency of house inspection in the towns which he compared. Again, notification had become compulsory in the towns dealt with at various dates from 1876 to the present time, and the figures for towns so varying could not therefore be compared. In regard to the two towns which had had notification longest, Bolton and Huddersfield, Mr. Biddle was entirely silent as to the zymotic mortality in the prenotification period. It is true these figures for these towns are not given in the Registrar-General's reports before 1882, but they could have been had on application to the medical officers for these towns; in fact, he believed he had himself furnished Mr. Biddle with the figures relating to Huddersfield, but he had not made use of them in his paper. From a study of the figures he believed it was true, as Mr. Biddle alleged, that the mortality from the notifiable diseases had not decreased in the towns with notification at the same rate as those without, but Mr. Biddle had not pointed out that the proportionate decrease of the notifiable and non-notifiable diseases in the towns with and without notification was different. Comparing the years 1874–5–6 with the years 1886–7–8 in the large towns with notification, the notifiable diseases had decreased 58, and the non-notifiable 14 per cent., while in the large towns without notification the decrease of the notifiable had been 68 and of the non-notifiable 26 per cent. While the

decrease, therefore, in towns without notification had been rather more than twice as much in the notifiable as in the non-notifiable groups of diseases, in the towns with notification it had been more than four times as much.

In answering questions that had been asked, he said that typhus fever had frequently occurred in Leeds. His paper illustrated the evil of not notifying, for he felt quite sure that the first case of the disease which they had been able to trace, and which had been in existence a month before they heard of it, although attended a great part of that time by a medical man, would have been at once notified to the medical officer had it occurred in Huddersfield, where notification had been long compulsory, and where the medical men were consequently much more on the look-out for the occurrence of infectious diseases than in a town like Leeds, where information was optional. The mere fact of having to notify had an educating influence upon the medical men themselves.

Dr. Boobbyer briefly replied.

Mr. Biddle, in replying, said that his chief objection was to the medical man being made the notifier, this task more properly belonging to the householder. He supported the single as against the dual system.

The three following *Resolutions* were carried by large majorities in each case:—

1. Proposed by Dr. Low (Leeds), seconded by Dr. Spottiswoode Cameron (Leeds):

> "That notification of infectious diseases in all countries should be made compulsory."

2. Proposed by Dr. A. J. Martin (Paris), seconded by Dr. Vivant (Monaco) and Dr. Janssens (Brussels):

> "That it is desirable that the notification of infectious diseases should be made by the medical attendant."

3. Proposed by Dr. Currie (New Brunswick), seconded by Dr. Farrell (Nova Scotia):

> "That in the opinion of this Section notification of infectious disease should be made compulsory upon the medical attendant and the householder in whose house the disease occurred."

What Steps should the State take to prevent the Spread of Venereal Diseases?

BY

J. Birkbeck Nevins, M.D. Lond., Pres. Nat. (Brit.) Med. Assoc. for the Repeal of the Contagious Diseases Acts.

Before venturing to offer any suggestions on this important question the first requisite is to inquire what steps the State has taken in times past, and with what results; and the wider our research becomes the more strongly is the conviction forced upon us that the State, as represented by legislation, can do little directly to accomplish the object;

that legislation has proved a failure thus far; and that the only real hope for the future lies in a higher moral tone throughout the community, by which immorality will be lessened, and its consequent resulting evils to health and otherwise will be reduced.

Past Steps adopted, and their Result.

When the Pagan ideas and usages in connexion with prostitution were succeeded by the Christian conception of sexual vice, penance was enforced upon the sinners of both sexes. But, under the violence and harshness of the mediæval times, this penance upon both sexes was changed into public floggings and other cruelties upon the women only, while the men became exempted from public penalties, until the community revolted against the brutality of the system, and it came to an end.

Then followed (at any rate in England) a prolonged ***period of laissez-faire***, in which the State nominally regarded prostitutes as "disorderly persons," but practically left them unmolested unless they were really disorderly in the streets; and this system led, it was said, to such an amount of disease (at any rate in large towns and amongst the soldiery) that Napoleon I. inaugurated the system of "regulating" the public conduct and examining officially into the health of prostitutes, which has been known since then as the ***system of "réglementation,"*** under the "police des mœurs" (police of (public) manners or of (public) morals). This system has been carried on with unrelenting vigour in Paris and other large cities in France for nearly a hundred years; and now let M. Lecour, the head of the Parisian police; M. Dr. Jeannel, a most ardent advocate of the system in Bordeaux; and the Municipal Council of Paris itself, be the evidence as to its results, both moral and hygienic.

M. Lecour, the Prefect of the Police des Mœurs in Paris, in the last edition of his work on prostitution in Paris, published about 1873, says at page 47:—"Not only the police but all the world knows the cause "of the ***increase of prostitution***—religious feeling is weakened, and "tolerance of venal and scandalous intrigues has entered into our "ethics." And at page 57 he says:—"***We may recognise amelioration*** "***as far as outward disorder is concerned***, but we are none the less "sensible that ***the ever-rising tide of debauchery*** is due to causes which "repression (*i.e.*, the police) cannot reach."

Dr. Jeannel, of Bordeaux, in his work,* pp. 1 and 2, bitterly reproaches M. Lecour for the increase of profligacy in Paris. He says, p. 182:—"The streets of Paris and all places of public resort are crowded with the abandoned;" p. 196:—"Cabs, coffee-houses, "public-houses, railway stations, theatres, hotels, lodging-houses, and "shops are used as their lairs or hunting grounds;" p. 386:—"Scandalous scenes are enacted in the streets, and the ***hospitals for*** "***venereal diseases*** are ***crowded***." And this, be it observed, is not the

* De la Prostitution dans les grandes villes, aux 19th century, et de l'extinction des maladies veneriennes. Par Dr. Jeannel, 2nd edit., Paris, 1874.

picture drawn by a "fanatic" or an ignorant opponent of the system, but by one of its most enthusiastic advocates.

The Municipal Council of Paris, 28th December 1880, passed the following resolution after long controversy:—"The Municipal "Council, considering that the institution of the police des mœurs is "destructive of the principle of individual liberty, *without succeeding* "in accomplishing the end it proposes to aim at, *either in the diminu-* "*tion of venereal diseases*, or in the prevention of offences against "public order and decency;" Resolved—"That from and after the 1st January 1882, the police des mœurs shall be abolished."

The results in Brussels, after 30 years' experience, and in Zurich, might be quoted, but it would unduly lengthen this portion of the paper.

ENGLAND.

The Contagious Diseases Acts—"C.D. Acts."

Influenced by reports from Paris and Brussels—but chiefly from Paris—although the amount of venereal disease in the Home Army and Navy had been rapidly and steadily diminishing for several years, the Administrative Departments of the Army and Navy succeeded in passing through Parliament, unknown to the general public, and practically unknown to Parliament itself, three Acts in 1864, 1866, and 1869, entitled the "Contagious Diseases Acts" (C.D. Acts) for the sole avowed purpose of lessening venereal disease in the Army and Navy. There was no profession of any desire to promote public order or to lessen prostitution, and the essential principle of the Acts was a combination of hygienic surveillance of common prostitutes and hospital provision for their treatment, along with a modified revival of the personal penalties upon such women which had characterised former periods of the treatment of prostitutes. The essential features of the Acts were that the women were to be placed upon the police register, and rendered subject to many penalties from which they could only be removed by magisterial authority; that they were to submit their persons to periodical examinations for the special form of disease called venereal, with all which that involved against womanhood; and that they were to go to prison if they refused or neglected to submit regularly to these examinations. They were subjected by successive Acts to greatly increased compulsory detention in hospital, from three months at first to six months in 1866, and to nine months in the "amended" Act of 1869, and if they left the hospital without the consent of the medical officer, they were to go to prison for a period of two months, but without hard labour. But as this penalty was not found to have "terror" enough, the "amended" Act of 1869 raised the penalty to *three* months' imprisonment *with* hard labour, and other penal conditions were added.

The result of this mixed sanitary and penal enactment has been, *after* 16 *years' adoption*—

a. That the *rate of improvement* in primary venereal sores* in the subjected portion of the Home Army was *reduced* from 6·7 per cent. yearly for the six recorded years *before* the Acts, to 0·65 per cent. yearly during the 16 years of the Acts.

b. That *inefficiency* in the Navy (20,000 strong) *increased* from 172 men daily to 230 men daily.

c. That venereal disease *rose* among the registered prostitutes by above 39 per cent. (from 121·6 to 169·5); and

d. That the Nation and Parliament revolted against the moral and social evils of the system, and after 16 years' trial have abolished it.

INDIA.

The Contagious Diseases Acts (C.D. Acts).

In 1871, an Act was passed in India for the Army there, similar to, but much more severe than the English Acts; for the fortnightly periodical examination of the women in England was replaced by a weekly or even daily examination in India, with the result that venereal diseases *rose* steadily year by year in the British troops in India from 196·8 per 1,000 in 1871—the year the Act was passed—to 389 per 1,000 in 1886—an increase of 97 per cent. in the 15 years of the Acts there.

New Indian Regulations and Result.

The above increase of 97 per cent. *under* the Contagious Diseases Acts was discouraging, to use a mild term. But it is sometimes said that Englishmen never know when they are beaten; so a new and startling order was issued by the *Commander-in-Chief* in India in June, 1886, to the commanding officer in every cantonment in India.

Regulation.—The *medical officers* were to see that the examinations, &c., were strictly carried out, and the *commanding officer* was to take care that *sufficiently numerous and sufficiently attractive* prostitutes were provided for every cantonment, and that the quarters in which the women were lodged were *sufficiently comfortable and attractive to satisfy the demands of both the women and the men.* If their quarters did not already comply with this it was to be reported, and the deficiencies supplied as quickly as possible.

Sanitary Result.—The latest officially-published hospital statistics for India are for the North-Western Province of India and Oudh, 1886, containing 14 large cantonments. In four of these, one prostitute was provided for every 17 men. In three of them, one for every

* This one form of disease is specified because it is acknowledged in the Army reports that gonorrhea was not sensibly improved by the Acts in the subjected as compared with the unsubjected stations, and the comparison between the two classes of stations was never made for secondary syphilis.

9·9 men. In four of them, one for every 7·25 men; and in three of them, one for every 3·9 men, with the following result:—

Four stations:—One prostitute to every 17 men; cases of all forms, venereal disease*, 170 per 1,000 men.

Three stations:—One prostitute to every 9·9 men; cases of all forms, venereal disease*, 263 per 1,000 men.

Four stations:—One prostitute to every 7·25 men; cases of all forms, venereal disease*, 402 per 1,000 men.

Three stations:—One prostitute to every 3·9 men; cases of all forms, venereal disease*, 546 per 1,000 men.

As these results are not satisfactory, still more stringent regulations are talked of as necessary.

SWEDEN.

Periodical Examinations of the whole Adult Civil Population for 49 years, and their Result.

By Royal Charters and "Instructions," which have the force of law in Sweden, the following examinations have been ordered at successive intervals, in 1812, 1817, 1822, 1824, 1839, 1843, 1864, and 1873, to the governors of counties, doctors, parish clergy, parish lay authorities, Board of Commerce, and military authorities.

Examinations for venereal disease to be made of visitors at inns, fairs, and other great gatherings of people, and also, if possible, of all market women coming to sell their wares, and pedlars must obtain renewed certificates of health every three months; wet nurses and domestic servants before engagement must produce certificates of freedom from venereal diseases, and also all babies ("foundlings") on being put out to nurse; all "herring fishermen" are to be examined on returning home, and all ship's crews must also have a certificate from the captain, of freedom from venereal disease on returning home. All young men of *twenty-one* must be examined on commencing the compulsory period of military training extended over two years. The *troops* to be examined weekly. The governors of counties are to send all infected persons to the nearest lock hospital, and in country places the parish rector (parson) has the same duty imposed upon him, and if necessary, in case of a refractory person, he must call in the aid of the county police through the county governor. All these patients are to be in hospital until cured, at the public expense, and all parishes are to levy a rate of 50 "ore" on every man, and 25 on every woman (about 7*d.* and 3½*d.* or ½ and ¼ franc), for the support of the lock wards.

"*General*" *Inspections.*—These are a sanitary regulation believed to be peculiar to Sweden and Finland. They used to be common in both countries, but "they were not considered to have attained their end," and now they are rarely heard of. This "general inspection" was

* The different forms are not recorded separately in the official Indian Hospital Reports but are classed together as "venereal diseases."

an examination, for venereal disease, of *every man, woman, and child* at irregular periods, in any suspected district of the country.

Result.—It would be difficult to devise a more "thorough" scheme of examinations and compulsory hospital treatment than the above, which were in force from 1812 to 1873, and then became practically obsolete. The official return of results, as announced by Professor Odmanson, at a meeting of the Swedish Association of Physicians, on the 19th February, 1889, when the subject was before the Swedish Diet, is, that in Stockholm *County* (*excluding* Stockholm *City*) (which would be like Middlesex, Kent, and Surrey, *excluding London*), venereal cases have fallen in the 49 years, from 2,741, the average of the first half of the period, to 1,665, the average of the last half, which equals a yearly average of 1·6 per cent.

It is scarcely surprising that a fall of little more than one per cent. yearly, during 49 years of all this medico-police bondage upon the public, aided by such general improvement in the education and social state of the country as has been going on at the same time, should have appeared so far unsatisfactory to the Swedish nation, that the above recorded regulations have become practically obsolete.

DENMARK.

In 1874 it was made law that everyone, male and female, who became affected with venereal disease must go to a hospital or a private medical man for treatment, under penalty of a fine for neglect. If there is reason to think that the medical orders are not carried out, the patient must go to hospital until cured, under penalty of a fine. And every medical man, hospital or private, must send in weekly or monthly to the official registrar a report of the number of his cases.

(*a.*) If a wet nurse is syphilitic and takes a situation, she is subject to a fine.

(*b.*) Every patient, whatever his financial position, is entitled to *gratuitous* hospital treatment for these diseases, and after having had constitutional disease is bound to attend periodically for inspection as long as he is desired to do so.

(*c.*) These regulations are believed to have been duly carried out.

Results—Army and Navy.

Venereal Diseases combined.—12 Years, 1874 to 1885.

Average Ratio—the whole 12 years.

Copenhagen	- Réglementée	- Fleet	-	38·7
„	- „	- -	Army -	19·1
3 Garrison Towns	„	- (no fleet)	„ -	8·8
4 „ „	(*not*) „	- „	„ -	7·5
1 „ „	Réglementation abolished in 1879		„ -	5·3

The whole period shows no advantage from Réglementation.

Divided into two periods of 6 years each.

					Increase.
Copenhagen	- Réglementée	- Fleet	- 2nd period	- 122	per cent.
„	- „	- Army	- „	- 32	„
3 Garrison Towns	(*not*) „	- „	- „	- 29	„
4 „	„ „	- „	- „	- 7	„
1 „	„ Réglementation abolished at end of 1st period	- „	- „	- 52	per cent. *reduction.*

The greatest proportion of increase was in true syphilis.

These results are not favourable to Danish Réglementation.

(Dr. Giersing, Ancien Médecin du Chapitre Royal à Vallo. "Revue de Morale Progressive," p. 32, June, 1877, Paris and Brussels.)

NORWAY.

In *some* of the *larger* towns the medical men are *directed* by municipal authority, under the Public Health Act of 1860, to report *daily* any new cases of venereal disease, but not the names or address of the patients, and they are *requested* to report as accurately as possible the supposed source of contagion. This law has existed for 30 years, and "it *may* be *supposed* that in *some* towns *most* of the new cases are "reported; but the request as to the source of contagion is very "deficiently attended to."

a. (My informant is not able at present to give any information as to the sanitary results of the regulation, although having exceptional opportunities for doing so, if the knowledge is attainable.—J. B. N.)

So far for the steps that have been tried by the State and their result; the judgment upon them must be left to the reader.

Proposed steps for Checking the Spread of Venereal Disease now recommended to this Congress for consideration.

The foregoing drastic methods for endeavouring to check the spread of venereal disease have been actually adopted, and for periods sufficiently long to test their sanitary results thoroughly (and it is with sanitary results only that we are here concerned); and after them, the proposals I have to make will to some seem tame and feeble indeed. But the severe remedies have proved worse than failures, and possibly milder ones may succeed better. I now submit them to your consideration.

1st. *Sufficient Hospital Provision.*—To this primary requisite all are agreed who have taken part in the controversy on the subject, but the difficulty is how to obtain such hospital provision; and my remarks

must apply mainly to England, as being the country with which I am best acquainted (though they admit of easy adaptation elsewhere).

In England there are ample and sufficient hospitals, supported by voluntary contributions, for almost every form of disease and for every class in life except those who can afford to provide medical aid for themselves. But this one particular class of diseases is absolutely excluded by their rules from admission in many hospitals, and is practically excluded, though not absolutely forbidden, in many others. The reasons for this are various and difficult to be overcome; and we have to deal with the fact as it is—that primary venereal diseases are almost the only form of disease for which there is not provision in ordinary voluntary hospitals, and which the subscribers will not admit.

In this country there are also hospitals provided by the Poor Law Authorities, bound to admit "pauper" patients for hospital treatment, but none except paupers; and these hospitals are to a limited extent under Government influence; but the managers and officials of many of these Poor Law Hospitals are unfavourable to the reception of venereal cases, and throw obstacles in the way of admission. In some of these hospitals the authorities urge that the cases of this disease are due to the presence of soldiers and sailors, who are national servants; and the national funds therefore—not the local inhabitants—should be responsible for their hospital treatment.

The important and really very difficult question therefore arises —How is this requisite hospital assistance to be provided? Upon which I would urge strongly the following resolutions, passed by the Geneva Congress after discussion extending over many days, by the Hygienic Section of the British and Continental Federation for the Abolition of State Regulation of Prostitution, which was held in Geneva in 1877. This Congress consisted of about 500 members, representing 17 nations of Europe and America, and the members of the Hygienic Section were medical men, lawyers, statesmen, and others, all well qualified by experience of hospitals and of life, to form an opinion on such a question.

Resolutions:—"1*st*. That self-control in the relations between the sexes is one of the indispensable bases of the health of individuals and of *communities*.

"2*nd*. The Section of Hygiene desires especially to see removed all obstacles which at present prevent venereal maladies from being as extensively treated as every other form of disease in the hospitals which are controlled by municipalities and other public bodies, as well as in those which are supported by private liberality."

If the State, acting in its national character, were to ***urge this recommendation upon the managers of all voluntary hospitals***, such an appeal would carry much greater weight with the committees of such hospitals than if it was made by any private or irresponsible organiza-

tion; and if it should even be made unsuccessfully the first time, it might be successful if repeated once and again after some interval of time; and the Poor Law Minister of State would appeal with great weight to the managers of the Poor Law Hospitals, and would probably not make a persevering effort without an encouraging amount of success.

It is quite probable that some hospitals, both voluntary and official, might raise the objection above alluded to, that it is unfair to lay upon the subscribers to voluntary hospitals, or upon the local inhabitants, a burden that the State ought to bear for the treatment of disease arising largely from the national forces; and in such a case it would seem fair and wise that the State, through Parliament or otherwise, should recognise its responsibility, and subsidise the Poor Law Hospitals, to an equitable extent, in the districts where many soldiers and sailors in the Navy are collected. This is already done by votes in the House of Commons in the case of Portsmouth and some other large military stations; and it would only be extending the application of the same principle in subsidising beds in other Poor Law Hospitals, if the circumstances of the neighbourhood rendered this desirable.

In the case of hospitals supported by voluntary contributions, the same principle might be applied of subsidising beds—more or fewer—in cases in which the neighbourhood of troops rendered such assistance equitable.

The State would thereby be simply providing that this one form of disease, previously and exceptionally excluded from treatment, should have the same opportunity of medical aid as all others. It would not be making an exception in favour of immorality in this particular form of disease, and so, in some sense patronising it. It would simply be giving it an equal chance with others of obtaining medical aid.

In the case of voluntary hospitals, however, it is probable and almost certain that difficulty would arise from State aid to a voluntary institution. For the managers of such hospitals are jealous, and very rightly so, of any external interference with their independence; and everyone of experience is aware of the tendency of Government officialism to claim the right of interference, and gradually and almost inevitably to encroach more and more upon the independence of others. It may therefore be a difficulty of magnitude to arrange how the Government should subsidise beds in a voluntary hospital without coming in conflict with the local independent managing body. And after long and anxious consideration and consultation with others, the only solution of the difficulty that I can suggest as practicable is that the Government, after due inquiry as to the necessity of the case, should simply subsidise "so many" beds, and be content with a yearly report from the management that "so many" beds have been actually in use for the purpose intended by the State aid, and should then maintain or increase or lessen its grant in proportion to the work done, without any attempt at interference with the management of these beds or the

hospital generally* beyond the following conditions, which should be imperative.

Condition in every Case of Subsidy.

The admission of all patients to subsidised beds must be free to both sexes and to all ages, and their stay in the hospital must be absolutely voluntary.

a. The absence of compulsion is a sine quâ non, and upon this point the following evidence is important.

The compulsory examinations of the women, and their compulsory detention in hospital, under every system of Réglementation and Contagious Diseases Acts, has led to such an amount of clandestine prostitution and of concealment of disease in order to evade hospital detention, as is acknowledged by all continental authorities—police and medical—and by nearly all the evidence as to the practical working of the Contagious Diseases Acts in England. Compulsory detention, however strongly it may be advocated as theoretically desirable, is practically fatal to success.

Glasgow Lock Hospital.—This hospital furnished a striking illustration. Admission was made free to all applicants, with great benefit to the health of the city, but the managers imposed one condition, viz., that the patient should sign a voluntary undertaking not to leave the hospital without the consent of the medical officers. Even this purely voluntary engagement was, however, soon found to operate so unfavourably by deterring diseased persons from applying under such an engagement, that the managers of the hospital withdrew the condition, and made entrance and discharge alike absolutely free, with the result that there is now no hesitation in applying for admission at an early stage of the disease; and that the health of the city, as regards this form of disease, has been most favourably influenced.

House of Lords Committee, 1868.—*Report.*—This Committee was appointed to inquire into the operation of the Contagious Diseases Act of 1866, shortly after its enactment, and to advise as to future steps. Their report is as follows (p. v.) :—

a. "Although in London and other large centres of population it may be requisite that separate lock hospitals should be established, the

* An important illustration of the praticability of this proposal is to be found in what, in England, is now well known as the "Hospital Sunday Fund." Collections are made in nearly every place of worship in the kingdom on one Sunday each year, and the amount then collected is disposed of without appeal by committees of benevolent persons entrusted by the community with this duty. Hospitals desiring assistance make their application and submit their last annual report of work done, the income and expenses, &c., to the local committee, which takes into consideration the public importance of the hospital, the amount and character of work done, and the necessities of the hospital for aid, and then apportions its grant without any attempt whatever at interference with the way in which it is employed. The same investigation is made year by year, and the grants are proportioned accordingly. This system has been in operation for many years with unchallenged satisfaction.

evidence more generally recommends the establishment of lock wards attached to existing hospitals as most to be desired. It is important to remove every impediment to voluntary application for treatment at the earliest stages of disease. It is also very desirable, on religious and moral grounds, that there should be separate wards for the classification of the patients, so that the married woman, the fallen but not irreclaimable girl, and the most hardened prostitute should be properly separated."

The Chairman of the Committee, Viscount Lord Lifford, added the following, as representing the evidence more perfectly still (Draft Report, p. x.) :—

a. "The present experience of the working of the Act (1866) tending to show that its success has been much caused by the voluntary entrance into the hospitals by the women, and that many women of good character are the unfortunate victims of disease through no fault of their own, the Committee recommends that the lock wards should be administered as privately as possible, and should be subdivided, &c.," as already mentioned.

The Royal Commission, 1870, was appointed to inquire into the whole working, moral, social and sanitary of the Contagious Diseases Acts, in consequence of the public sentiment against the system, aroused by the new and additionally penal contents of the "Amended" Act of 1869. At that time all officialism was in favour of compulsion, and the public mind had not had time or opportunity for considering the subject maturely, the Acts having been passed with the public practically unaware of their nature. The evidence was, therefore, largely official, and the Report of the Commission appears to incline in favour of compulsory rather than of voluntary hospitals.

Report, 1871, sec. 63.—"We recommend that aid be given to "lock hospitals, or to hospitals with lock wards attached, from the public "funds," and in the same section the Commission speaks favourably of Mr. Prescott Hewitt's evidence before the Lords' Committee. "It "would be to the interest of every hospital that there should be a "syphilitic ward attached to it.—I have no doubt that if *there were a* "*little pressure put upon the hospitals* every hospital would be too "glad to do it."—"Mr. Hewitt prefers the addition of lock wards to "existing hospitals rather than the establishment of hospitals for the "treatment of venereal diseases exclusively, and gives, we think, "sufficient reasons for his opinion, viz., that women entering a lock "hospital are at once stamped by doing so, while no reproach attaches "to them if they have simply been in St. George's, Guy's, or St. Bar"tholomew's, &c., hospital. As to the general hospitals, it would be "difficult to manage them upon any other than the voluntary principle. "So essential, however, is detention to the effectual working of the "hospital system, that we would exact that women applying for "admission should remain for a period not exceeding three months." The difficulty of the question is, however, exemplified by sec. 52 in

the same report, in which the Commission says, "As regards voluntary "applicants, there could be no objection to the patients being required "to enter into an engagement to remain until discharged by the "hospital authorities.—*We are assured, however, that few women "would enter under such a condition.*"

a. Sec. 66.—"We recommend that the periodical examinations be discontinued."

National (British) Medical Association for the Repeal of the Contagious Diseases Acts.—In 1880—ten years after the Royal Commission report, and after much experience had, in the meantime, been accumulated, this association published a pamphlet, entitled—"What public measures can with benefit be adopted for the diminution "of venereal diseases?" The pamphlet rapidly passed through six editions, and many thousand copies were sent to all the voluntary hospitals in Great Britain—to the members of both Houses of Parliament, to some corporations, and to other public bodies, &c. Its recommendations were substantially those now advocated in this paper, except that no allusion was made to State subsidies of poor law or voluntary hospitals.

British and Continental Federation for the Abolition of State-Regulation of Prostitution, Genoa, 1880.

The Congress of this Federation, held in Genoa in 1880, translated the above pamphlet into Italian, in which language it was read to the Congress, and copies in Italian or in English were distributed to the members. This Congress consisted of about 400 members, representing 14 European and American nations; and at the close of its sittings, a resolution was passed adopting the paper generally as expressing its views on the subject of *free admission to hospital and the absence of compulsory detention*, though without committing itself to every detail.

Select Committee of the House of Commons, 1879–1881.

The latest official utterance on this subject is from the above Select Committee in its two reports in 1881.

The Committee, as originally appointed, consisted of nine members, who had either voted previously *in favour* of the Contagious Diseases Acts once or oftener or had otherwise publicly advocated them; and of six members who were similarly committed *against* the Acts. The Committee took evidence for three years and then reported, after above 70 divisions before the report was agreed upon. With one exception, on a matter of detail, every one of the nine voted for the report in favour of the Acts, and every one of the six voted for another report against them. The House of Commons ordered both reports to be published and issued together. One is here described as the "majority" report—the other as the "minority" report. They were diametrically opposed to each other on this as on almost every other question.

Majority Report, pp. xxix–xxx.

"Your Committee consider that compulsory detention in hospital is absolutely necessary for the effectual cure of disease, and they recommend its maintenance as at present." (Nine months.)

a. "Your Committee recommend the institution in some of the unsubjected districts of ***female lock hospitals***, supported by State aid and charitable contributions, to which ***entrance shall be voluntary***."

Minority Report, Section 16.

The mitigation of disease could be effected in a voluntary hospital as well as in a compulsory one, ***provided that the requisite co-operation of the patient was secured.***

a. The practical question is whether results, equally beneficial as regards the prevention and cure of disease, can be attained without the compulsory periodical examinations and the restrictive hospital system of the Acts. The evidence on this subject relates to the four principal voluntary lock hospitals in the United Kingdom, viz., London, Dublin, Glasgow, and Liverpool, and also to two smaller hospitals instituted by the rescue societies in London and Bristol.

b. [The evidence on this subject in the minority report is long and careful and ought to be studied in extenso. The following is a brief extract of it.]

c. London.—Mr. Lane. Beds divided between Government and voluntary patients.

d. Number of "voluntary beds" very inadequate, therefore only the ***worst*** cases are admitted, while on the Government side every case sent compulsorily is admitted, however slight. The voluntary cases are therefore the most severe and take the longest time for their cure.

e. The women voluntarily remain for long periods, even as long as 86 days on the average in 1873 down to 37 days in 1880, when the cases had become milder. About 20 per cent. left before being completely cured, but 29 per cent. of the patients (in 1881) were married women and domestic servants who would not leave to go to prostitution.

f. The deputy chairman gave evidence that "the Government "patients are more difficult to manage than the others ***because we cannot "control or dismiss them.*** On the voluntary side we can dismiss them, "and that makes a great difference." This implies that premature dismissal is regarded as a punishment, not a boon, by the voluntary patients.

g. Dublin.—Mr. Macnamara. Voluntary. Cases bad. Mild cases do not apply. The majority left before complete cure, but 40 per cent. of the patients are not prostitutes, and would naturally be anxious to go. Mr. Macnamara prefers free lock hospitals, with inducements to women to remain voluntarily, but with power to detain when necessary.

h. Glasgow.—Dr. Patterson. Voluntary. Beds at first too few—increased from 36 to 60 in 1870. Never all required now. The

severity and amount of venereal disease had diminished in Glasgow in recent years. No case is ever refused admission. Cases apply earlier than formerly. Very few cases leave uncured. No trouble in inducing even prostitutes to remain. In 1871 the directors required the women to sign an engagement not to leave before they were cured, but that was soon abandoned as it was found to prevent the women from applying for admission.

i. London Rescue Society's Hospital. — Mr. Cooper. About 10 per cent. leave uncured, but not to go to prostitution. The average stay of the patients in the London Rescue Hospital is 74 days.

j. Bristol.—Lock Hospital. Small and voluntary. About 12 per cent. leave uncured.

k. Liverpool.— Mr. Lowndes. Voluntary. Female beds were not filled while students were admitted to see the patients. They are now excluded and the beds are well filled. The place has also been made more attractive, and menial work (scouring the floors, &c.) is not now required from the patients. Nearly all are prostitutes, except about 10 or 12 per cent. married women. In 1880 about 12 per cent. left uncured, chiefly married women. Witness wished to possess the power of compulsory detention.

l. Large Workhouse Hospitals.—Dr. Nevins had obtained returns from 80 out of 160 of the largest workhouses, and the medical officers say, "with scarcely an exception," that the patients can easily be induced to remain in the hospital as long as they think necessary without the employment of compulsory detention. The witness was not, however, allowed to hand in the answers or to complete his evidence on the subject in consequence of a decision by a majority of the Committee, that a witness who had *collected* evidence should not be permitted to state the general result of the information so received.

General Conclusion.—Upon the whole the evidence afforded sufficient proof that the system of *free* hospitals, *attractively equipped*, *well officered*, and "no case refused for want of room" (the Glasgow rule), is quite practicable and completely successful, even without the power of compulsory detention. Taking the evidence as it stands it appears certain that the number of actual prostitutes who would discharge themselves prematurely from hospital for the purpose of resuming prostitution is proportionately small, and probably does not exceed (even if it equals) the number of those who, in places subjected to the Acts, now actually evade registration. These "clandestine" prostitutes are precluded from hospital treatment altogether, for the workhouse authorities, in subjected districts where hospitals certified under the Acts are established, no longer receive female venereal cases, except occasionally from such hospitals.

The steps that have been adopted in past times and those which I have ventured now to submit for your consideration, having

been passed in review, I will conclude by laying before you some *proposals* that have been made from Austria, France, America, and Portugal for the purpose of preventing the spread of venereal diseases, but which have not been submitted to the test of trial, since the experience and failure of Sweden, already recorded. It will be for your judgment whether they deserve praise or blame from this International Hygienic Congress.

VIENNA.

Resolution passed by the International Medical Congress in Vienna, 1873.

At the International *Medical* Congress, which met in Vienna in 1873, *it was resolved* that a proposal should be submitted to the Governments of Europe, to which, however, it was feared that England would prove an obstacle. The proposed plan was to be rendered effective by international treaties between the different States, and among other points considered necessary were the following:—*Municipal* and *provincial* authorities are not to be trusted with carrying it out, but the administration of the suggested law throughout the whole country is to be *solely in the hands of the Central Government*; all bodies of people—such as soldiers, sailors, policemen, *civil servants in the employ of Government*, men or women working in *factories*, *domestic servants*, and all concourses of people, as at *fairs*, *markets*, *pilgrimages*, &c.—are to be subject to strict medical examination; all expenses shall be paid out of the Government taxes—not out of local rates—by which all local checks upon expenditure and other local objections will be prevented; and lastly, "*a sufficient number of medical men shall be employed and handsomely paid*" for working the system.

LYONS.

This was also a recommendation, in almost identical words, from a commission appointed in Lyons by the French Government, to report upon the subject of preventive measures and regulations. It contained also the following addition—

That the keepers of brothels *shall be responsible to the men who frequent them, if they contract disease*, for, "*Is it not just* that "authorised brothels should give to the *public every possible security?* "*Is it not just* that the mistresses of these houses should suffer for their "want of care when they have not fulfilled the *conditions of the con-* "*tract?* And among these conditions are most important ones, that "they shall take care of the health of their unfortunates, and *preserve* "*from every risk* the men who go to seek in their houses pleasures "reproved, it is true, by morality, *but not forbidden by law.*"

Inoculation with Syphilis Recommended in the Vienna Congress.

At the above Medical Congress of Vienna, Dr. Auzias Turenne dwelt upon the importance of *inoculating all male children with syphilis* as a safeguard against their contracting it for themselves in

future. It seems scarcely possible to credit that a man of reputation could seriously propose to a medical congress that every male should be saturated with this loathsome disease in childhood in order to save it from contracting the disease in manhood; and that an assembly of educated men could sit and patiently listen to such a proposition without an indignant denunciation, and even without a protest.

Circumcision of all male children was recommended to the same Congress by Dr. Cohen.

56. AMERICAN PROPOSITIONS.

MADE TO THE MEDICAL ASSOCIATION OF THE U.S. AMERICA, BY DR. MARION SIMS, 1876; AND BY DR. GIHON, MEDICAL DIRECTOR-GENERAL OF THE U.S. NAVY, 1879.

At the annual meeting of the Medical Association of the United States of America, held in Philadelphia in 1876, the members, numbered by hundreds, and representing the medical profession of the whole of the United States, Dr. Marion Sims proposed that on every ship coming into the United States from a distant port, the male *steerage* passengers should be compelled to submit to a personal examination for venereal disease; but the *cabin passengers should be free.* The sailors before the mast must submit to be examined, but *the officers should be free.* The examination was to be made by a doctor, if there was one; but if there was not a doctor, these free men and citizens of various kingdoms of the world were to submit their persons to examination by the quarantine officer of the ship. And if, in the opinion of the examiner, they were diseased, these free men were to be sent to hospital and detained there (regardless of their families) or they *were to be sent back to the country from whence they came.* And this proposal, accepted with acclamations of applause, was ordered to be printed, and circulated gratuitously.

At the annual meeting of the same medical society, held in New York in 1879, Dr. Gihon, the medical head of the United States Navy, urged upon the meeting that "*a well organised sanitary service,* " with its *agents,* be established in *every hamlet, village, town,* and *city* " of the country. Let these agents find out the progenitors of con- " tagious (venereal) diseases, and having discovered them, be empowered " to isolate and *exterminate them.* Let them track syphilis to its lair, " and, whether in man or woman, *in any way and at any cost,* let " them make it impossible for another human being to come within its " baneful influence. . . . There is an *army of doctors* overspread- " ing the country, and annually recruited by thousands. Why not " transform these men, of whom so many *idly and hungrily await the* " *prey stricken down* for them by disease, into busy workers keenly on " the scent to avert that which now *they cannot but welcome.*" The reporter adds, that the applause at the close of the address was hearty and prolonged, and, immediately on its conclusion, a motion was unanimously adopted to appoint a Committee, with Dr. Gihon for its chairman, to consider the suggestions of the address, and report to the next

meeting resolutions looking to the *establishing of a plan for protection* from venereal diseases.—From the *Sanitarian*, January, 1880, New York.

[I believe, however, that the Committee never reported.—J.B.N.]

Proposals to the International Medical Congress in London, 1881, Section of State Medicine.

By Dr. Cunha Bellem, Lisbon, Member of the Royal Academy of Science.

The tyranny of syphilis can only be counteracted by the *tyranny of inspection*. If everyone can *demand as a right that, even as the result of imprudence, he shall not contract syphilis*, no one can have the right to transmit it to others, and in order to guarantee this liberty, there is no other resource than the *inspection* of all persons *suspected* of having syphilis. Syphilis will in the end be got rid of, or it will at least be banished into the sanctuary of married life, where it cannot be subjected to any controlling influence.

By Dr. B. Kraus (Vienna).

He believed that public prostitution could be effectually controlled, provided all prostitutes were compelled to ply their trade in licensed brothels. As regards clandestine prostitution, no remedy would be satisfactory short of an *enforced examination* of the *working classes*, through whom the disease was mainly spread; and a series of propositions were laid down as to the *periodical examination of artizans in factories*, and *domestic servants, both male and female*, the examination to be followed by the issue, free of cost, of *a certificate of health*. In this way only could persons be saved from the risk of syphilis being conveyed to their children by nurses, and to themselves and their families by means of infected food, &c. The remedy, he admitted, was a severe one, but it was the only efficacious one, and *he trusted the Congress would bring the subject under the notice of the Government*. (After the discussion which took place in the State Medicine Section, no attempt, however, was made by the advocates of the system to carry any resolution in favour of Regulation of Prostitution.)

To sum up these recommendations, the steps now proposed to you are, that—

a. The *State* should *urge*, perseveringly if necessary, all voluntary and poor law or municipal hospitals to admit venereal cases, whether male or female, *freely* to treatment on an equal footing with all other forms of disease.

b. That entrance to the hospital should be encouraged rather than discouraged, so as to attract the cases in their early stages; and that while the patients are encouraged and even urged to remain until cured, no compulsion whatever should be employed to detain them.

c. That the State should, if necessary, subsidise beds for venereal cases in existing hospitals, whether voluntary or under public control;

but should not establish separate new lock hospitals. And in the case of hospitals, whether voluntary or supported by public local funds, the State should strictly abstain from any attempt at authority in the hospital, or interference with the existing managing bodies.

On the Sanitary Condition (*re* Venereal Diseases) of the British Home Army previous to the Contagious Diseases Acts, during their Operation, and since their Abolition.

BY

J. Birkbeck Nevins, M.D. Lond., President of the National (British) Medical Association for the Repeal of the Contagious Diseases Acts.

In 1860, and for some years previously, the amount of venereal diseases in the British Home Army and Navy was large and alarming to the Administration.

Lord Herbert, at that time H.M. Secretary for War, appointed a Commission which made many most important recommendations, moral, social, intellectual, and sanitary, for improving the character, surroundings, and health of the Army.

These were carried out in a large portion of the Army as rapidly as the votes in the House of Commons made possible (Evidence of Select Committee, House of Commons, 1881, Ques. 2854–8 and 2971–3), but slowly and imperfectly, or not at all, in another large portion of the Army (Evidence above), with noteworthy results.

As "the conditions of residence in camps and in towns are different," the health of the Army was at that time, and until 1867, recorded in the Army Reports for "Camps" (Aldershot, &c.), "Seaports" (Portsmouth, &c.), "Arsenals and Dockyards" (Woolwich, Chatham, &c.), "London," "Dublin," "Manufacturing Towns" (Manchester, &c.), and about 100 "Remaining Stations" of no specially marked character.

Lord Herbert's improvements were applied rapidly as above mentioned to the "Camps," "Seaports," and "Dockyards," with a reduction of primary venereal sores in six years of 28 per cent. in the "Camps," 29 per cent. in the "Seaports," and 38 per cent. in the "Dockyards" (calculated from the Army Reports, 1860–66), *before the Act of* 1866 *was passed.*

The improvements were applied slowly as above mentioned to London, Dublin, and the manufacturing towns, and on the average of the six years London was worse than at first, Dublin was the worst throughout the whole period, and the manufacturing towns, which were largely diseased, improved only 21 per cent. instead of 28, 29, and 38 per cent.

Notwithstanding the above continuous great improvement the Contagious Diseases Act of 1866 was passed, and it was applied to *all* the camps, *all* the seaports, the dockyards, and to five other less important places from the "remaining stations," making 14 stations in all which were selected and put under the Acts, and Lord Herbert's improvements were pushed on more earnestly still (Evidence as above).

This group of 14 stations had improved without interruption for the six years before the Acts were in existence at the average yearly rate of 6·7 per cent. upon the original amount of disease.

On the other hand, London (which had fallen off instead of improving), Dublin (the worst station throughout), four of the largest manufacturing much diseased and slowly improving towns, and *one* dockyard were selected for comparison, and the number of 14 was made up from the "remaining stations." These 14 stations were *not put* under the Acts, and Lord Herbert's improvements were carried on inefficiently and slowly as before (Evidence as above).

When the Acts were added to Lord Herbert's improvements, it was expected that the improvement in health would be much more rapid than before; but, instead of that, it was reduced to the average of only 6·3 per cent. upon the remaining amount of disease for the first six years of the operation of the Acts.

The then Secretary for War, Lord Cardwell, therefore now endeavoured by punishment to obtain a more favourable result, and accordingly in 1873 he stopped the pay of every soldier who was in hospital for primary disease. The result naturally was that the men concealed their disease from the Army doctors, and went to druggists or to other soldiers for treatment, and a large apparent reduction of disease immediately took place, and continued for three years at nearly double the rate of the six years previous to concealment.

At the end of these three years, however, in spite of the Acts and of concealment combined, disease commenced to rise rapidly, and continued to do so for four years at the rate of 22·7 per cent. yearly, until in 1879, after seven years' trial, punishment was removed. After this, the increase in disease continued for three years longer, until its amount had much more than doubled, the stations being (seven years —1875–82) still, however, under the most perfect operation of the Acts.

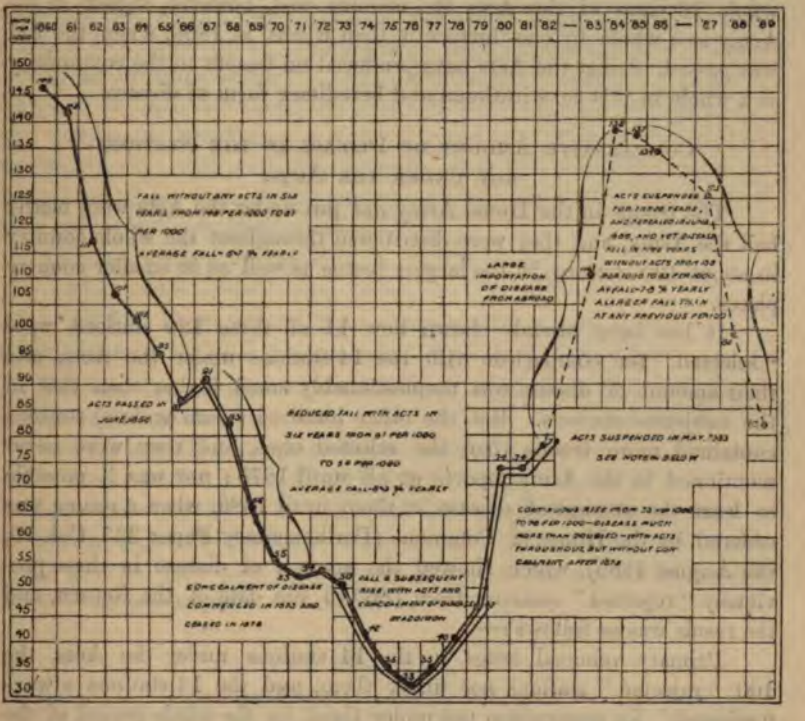
The result was that at the end of 16 years of the Acts, primary disease was only 9 per 1,000 less than it was in 1866, before the Acts were in existence, being an average improvement of only 0·65 per cent. yearly, instead of the improvement of 6·7 per cent. yearly for the six years previous to the Acts being in existence.

In the middle of 1883 the compulsory periodical examinations of the women, which are the essence of the Acts, were suspended by a resolution of the House of Commons, and immediately a most rapid increase of disease commenced, and continued until the autumn of 1884, when it ceased, and disease began to fall. This large and sudden increase was a cause of alarm to many Members of Parliament, who attributed it—not unnaturally perhaps—to suspension of the Acts.

The Secretary for War, however (the Marquis of Hartington), ascribed it in the House of Commons to the return of the troops from Egypt, where they were much diseased, and the subsequent Army reports, 1883–84, showed the correctness of his explanation, for many of these troops stopped in Malta, and many others in Gibraltar, on their way from Egypt, while the remainder returned to England. Both Malta and Gibraltar had always been and still remained under strict Contagious Diseases Acts, but the increase in 1883 was 98 per cent. above 1882 in Gibraltar, and 76 per cent. in Malta, while it was only higher by 42 per cent. in England. The increase continued in all three countries until the autumn of 1884, when the return of the troops ceased, and *disease began to fall.*

AMOUNT and COURSE of PRIMARY VENEREAL SORES in the 14 STATIONS put UNDER REGULATED PROSTITUTION (the Contagious Diseases Acts), from 1860 to 1889.

The Table embraces six years *before* any Acts, 16 years of their operation from 1866 to 1882, three years of *suspended* Acts, and four years of *repealed* Acts.



The single line indicates Lord Herbert's Commission alone in operation; the double line, the Acts in addition; the treble line, concealment also influencing the amount of disease; and the broken line, the altered condition of suspended and repealed Acts.

In 1886 the Acts were totally repealed, and in the five years since 1884 (to 1889, the latest year recorded) there has been an unbroken continuous fall in primary disease of 7·8 per cent. yearly in the 14 stations formerly under the alleged protection of the Acts instead of the continuous *rise* of 22·7 per cent. yearly during the last seven years of their operation. The fall in disease has not been so rapid in any period of the Acts as it has been during the five years since their suspension and repeal.

Throughout this paper primary venereal sores (called always primary "syphillis" in the Navy reports) have alone been spoken of, for it was acknowledged in every Army report that the Acts had produced no improvement in gonorrhœa in the stations under the Acts compared with those not under them, until concealment of disease commenced, and in the Navy gonorrhœa rose steadily in amount from 20 per 1,000 in 1886 to 78 per 1,000 in 1882, the las year of the Acts, and its severity also increased from an average duration of 17 days per case at first to 27 days per case at last.

Secondary syphilis was never computed for the subjected stations as compared with the unsubjected ones because the place where the primary was contracted was always uncertain. On the average of the whole 16 years of the Acts the amount was, however, higher in the Army as a whole by one-thirteenth than it was in 1866, when the Act was passed, so that the Acts have produced no benefit to the community as a whole in this constitutional and hereditary form of disease.

Comparative Amount of Disease in the Stations not under the Acts.

The troops in the Home Army *not* put under the Acts were nearly half the Army, and they were distributed throughout the whole country in about 120 stations, in the largest towns as well as in smaller country places.

It has been already shown how 14 of these 120 stations were "selected" for comparison with the 14 stations under the Acts, and their amount of disease was unquestionably much higher than that in the subjected stations. But the other hundred (more or less) stations contained more troops than the selected ones, and they were never mentioned in the Army reports at all until 1875; nor was it possible to learn the amount of disease in them until 1885, when a return was ordered by the House of Commons (Parliamentary Paper 325, Col. 19, 6th August 1885), which showed the amount of disease in these previously "rejected" stations, from 1860 to the date of the Return, and the result was as follows:—

Primary venereal sores in the 14 stations under the Acts, the 100 "rejected" stations *not* under them, and the 14 stations always "selected" for comparison not under them, for the whole period of the Acts (omitting the years of concealment of disease):—

14 Stations, under the Acts, average ratio 70 per 1,000 men.
100 Stations, not under Acts, previously "rejected" from comparison, average ratio 74 per 1,000 men.

14 Stations, not under Acts, but always "selected" for comparison, average ratio 136 per 1,000 men.

The 14 stations put under the Acts, and specially favoured both beforehand and also afterwards as already mentioned, can show barely an advantage over the 100 *rejected* stations not under them, while the group of 14 containing the specially bad and from the first neglected stations already described, were "selected" and have always been used for comparison to show the alleged injurious effect of the absence of Acts, and of that alone.

The sanitary results above shown previous to the existence of the Acts, during their operation, and since their repeal, afford no grounds for desiring their restoration or for attributing benefit to them during their continuance.

What Influence has the Repeal of the Contagious Diseases Acts had upon the Health of the Civil Population?

There are no known data for answering this question as to the general community; but there is one class of young men respecting whose *health* there is official information, viz., the Army recruits.

These youths are collected from all parts of the country, and they are of an age and in circumstances that would render them specially liable to be influenced by any condition likely to affect sexual diseases favourably or unfavourably. They number about 40,000 or 50,000 a year, and are carefully examined medically before being finally accepted. Any disease for which they may be rejected is recorded in the Army reports year by year, and these reports show the following results for the last four years during the operation of the Acts, and for the last five years since they have been repealed:—

Recruits rejected for *syphilis*, per 1,000 recruits:—

1879 to 1883, with Acts, average 10·1 per 1,000.

1885 to 1889, without Acts, average only 8·1 per 1,000

an *improvement* of 19·8 per cent. since the repeal of the Acts.

Rejected for "*impaired constitution*," which is so often the result of sexual misconduct:—

1879 to 1883, average 8·67 per 1000.

1885 to 1889, average only 6·01 per 1,000.

an improvement of 30·7 per cent. since the repeal of the Acts.

So far, therefore, the only available evidence shows that the repeal of the Acts has not been followed by injury to the public health but rather by improvement.

Deaths.

Stress has lately been laid upon some changes in the mortality from syphilis which are claimed as telling in favour of the Acts. Any inferences from the deaths from this disease are surrounded by fallacies and doubts, for the deaths per million of population are so few that two or three more or fewer make a sensible difference. There has also

been a great change in recent years in the views of the medical profession as to syphilis causing death where formerly it was not thought of as the cause. The deaths fluctuate largely from year to year in the individual districts, and the Registrar-General has never recorded the deaths from syphilis in the towns under Acts, and in other large towns without them, so as to enable a comparison to be made between different periods and different towns. Lastly, as death from syphilis does not generally occur until many years after infection, it is impossible to know whether the disease was contracted in the same town, or even in the same part of the world in which the death occurred.

London, however, with its large population, and England with its 29,000,000, are always recorded, and the following results may be taken for what they are worth :—

Deaths per 1,000,000 of population in England as a whole :—

7 years before the Contagious Diseases Acts, average 68 per 1,000,000.

16 years of Contagious Diseases Acts, average 84* per 1,000,000.

6 years since Acts ceased, average 76 per 1,000,000.

showing a considerable fall since the Acts were terminated.

Deaths per 1,000,000 in London (never under the Acts) :—

7 years before the Acts	-	-	average 119·5 per million
16 years of operation of the Acts	-	„	132·3 „
6 years since the Acts ceased in 1883		„	117·7 „

Again a fall in mortality since the Acts ceased, and a large one.

From these two results it appears that after six years' experience London, and England as a whole, have not so far suffered from the repeal of the Acts; but it is not safe to draw a wider conclusion than this at present.

No Reduction of Hereditary Mortality from Syphilis during the Operation of the Acts.

The most authentic and reliable information in possession of the medical profession and of the public on this point is given by Mr. Humphries (at that time senior clerk in the Statistical Department in Somerset House), who published a communication on the subject in the *British Medical Journal* in July 1876. The Acts had at that time been 10 years in operation. Mr. Humphries had access, from his official position in the Registrar-General's Office, to details to which the public has no access, and his communication was expressly upon the sanitary results of the Acts in the *places* themselves to which they had been applied—not to some assumed area 20 or 30 miles surrounding those places. He there says definitely that *there was no reduction in the mortality from hereditary syphilis in the stations under the Acts.* This statement is of unusual importance, for it is, we believe, the only

* It was about the beginning of this period that the change commenced in medical opinion as to syphilis causing death. The Registrar-General frequently commented upon it as probably influencing the apparent great increase of mortality.

distinct evidence on the subject accessible to the public. The Registrar-General's returns do not classify the deaths from *infantile syphilis* in the separate towns, and there are no official data with which we are acquainted that assist in showing whether infantile mortality has increased or diminished in the stations formerly under the Acts since their practical abolition in 1883.

On the Duty of the State with respect to the spread of Venereal Disease.

BY

J. Holroyde, M.R.C.S., D.P.H., Medical Officer of Health for Chatham.

In approaching the subject of State regulation of venereal diseases I will first of all briefly relate the history of legislation on this point. The first Contagious Diseases Act, for the prevention of contagious diseases at certain naval and military stations, was passed in 1864. This Act was of temporary duration, and in 1866 was superseded by a permanent Act, the provisions of which, although slightly amended in 1868–69–75, remained in force until the abolition of the compulsory clauses in May 1883, and the total repeal of the Acts in the year 1884. The substance of the Act was as follows:—Certified hospitals for the reception of women suffering from venereal diseases were established at the stations named in the Acts (14 in number), and an inspector of hospitals was appointed for each place. In cases of well-proved prostitution a woman was compelled to appear before the medical officer, and if found to be suffering from disease could be detained for three months, or until cured. Insubordination, or refusal to be examined was made penal, and keepers of houses of ill-fame who knowingly harboured any woman suffering from disease, were subject to fines or imprisonment at the discretion of the justices.

The subject was exhaustively inquired into by a special commission, which, after sitting for four years completed its inquiries in 1882, and which, reporting on the evidence before it, was strongly in favour of the retention of the Contagious Diseases Acts in our garrison towns. The House of Commons, however, voted against this recommendation, abolishing the compulsory clauses in 1883, and finally repealing the Act in 1884; and at that time it was prophesied by the supporters of these Acts that certain definite results would follow their repeal, viz.:—An increase of disease in the Army and Navy, increased disease and suffering amongst the unfortunate women who had been under the control of the Acts, and also an increase of general immorality, and of juvenile prostitution. Have these prophecies been fulfilled? The experience of

a large garrison town which has been under the operation of the Contagious Diseases Acts, and thereby affords means of comparison between its condition prior to and since their repeal, will supply an answer; and I will as briefly as possible endeavour to place before you the results of my observations and inquiries in the Chatham district, and to indicate the conclusions I have formed as the result of these observations. It is generally admitted in the town of Chatham that since the repeal of the Contagious Diseases Acts there has been great increase in the number of prostitutes, and especially of juvenile prostitutes, and there is a very strong feeling amongst many of the leading inhabitants that a retrograde step was taken when the Acts were abolished. Besides the good which the Acts did by restraining the vicious tendencies of many females, and by checking the spread of venereal disease amongst those who had already embraced prostitution as a means of livelihood, there were great facilities for reclaiming fallen women, and through the influences brought to bear on many of these poor creatures during their period of detention in the lock hospital, a considerable number were rescued from their degraded existence and were put in the way of leading honest and respectable lives.

Since the repeal of the Acts there is much greater difficulty both in getting hold of the women, and in bringing counter influences to bear upon them, and the chief reason why these influences so often result in failure is the absence of power to detain, so as to bring in the aid of time to the work of reclamation. The only place in the district set apart specially for the rescue work is a small shelter supported by the Rochester Diocesan Ladies Association, in which girls are voluntarily received and kept, when their physical condition allows, until such time as they can be sent away to homes. There are only three beds in the shelter, but very often they are empty for several days together, and both the matron and ladies who are interested in the work bitterly regret the absence of powers of detention. The matron of this shelter who is intimately acquainted with the unfortunate class, says that there is no doubt that a large increase of prostitution has taken place since the repeal of the Contagious Diseases Acts, and that a very large proportion are young girls, whilst there is also a large amount of clandestine prostitution amongst many females who ostensibly lead respectable lives, but whose morality would be better if the deterrent influence of the Acts still existed. My informant also states that a considerable number of the girls who come into her hands are diseased, and volunteered the remark that she knew of quite 200 such, many of them under 16 years of age; and that although they are prevailed upon in some instances to go under treatment in the workhouse infirmary, they seldom continue that treatment until cured, and in the majority of cases return to their calling whilst suffering from disease. With respect to the ages of many of these prostitutes, the following information taken from the record of work at the shelter is interesting as corroborating the general impression that juvenile prostitution is getting more prevalent. The first entry in the book is in January 1886, and since that period 137 females have been received into the shelter, and out of this number 79, or 58 per

cent., were under 21 years of age. The number admitted at different ages from 12 to 20 years was as follows :—

Age.	Number admitted.
12	1
13	2
14	3
15	8
16	17
17	17
18	5
19	15
20	11
Total -	- 79

Giving an average age of 16 years to 58 per cent. of these prostitutes.

The police who are employed in hunting up truant sailors and marines, and whose duty takes them into the various haunts of prostitutes, state that the condition of the town is far worse than when the Contagious Diseases Acts were in force ; that not only are there more brothels and prostitutes, but as one of the men phrased it "they are a far dirtier lot than in the old times." During the operation of the Acts these men were practically acquainted with every brothel in the town, now they are constantly finding out fresh ones, and say there are many they do not know of ; and as their daily duty has for many years lain amongst the haunts of soldiers and sailors, no one can be better qualified than they are to judge of the amount of prostitution in the district.

In a letter dated June 16th, 1891—the Stipendiary Magistrate for Chatham and Sheerness writes :—

"You ask for my views, as Stipendiary Magistrate for Chatham and Sheerness, on the effects of the repeal of the Contagious Diseases (Women's) Acts, with special reference to juvenile prostitution. I am not able to give you any lengthy details, I give therefore a general opinion only. I may say that individually and for private reasons, no one could be more glad than I was to be rid of the cases arising under these Acts. I hated such cases with a hatred greater than I felt for any other class of cases. Nevertheless, looking at the matter on public grounds, I am persuaded that the Acts were beneficial in the districts where I have to administer justice, and that prostitution with all its train of evil consequences is far more rife than it was, disease is more frequent, and especially, juvenile prostitution, notwithstanding what is known as Mr. Stead's Act, is far more common. This last saddening feature has been before me only too frequently of late, both at Chatham and Sheerness."

I remain,
Yours faithfully,
E. J. Athawes.

The feeling amongst the members of the Local Board of Health, and of the Medway Board of Guardians, has consistently been in favour of the Acts, and has been publicly shown as follows :—

In a letter dated April 17, 1885, and forwarded to the Prime Minister, after being signed unanimously by the members of the Local Board of Health, attention was drawn to the increase of juvenile prostitution in the district, in consequence it was alleged of the repeal of the Acts, and application was made for a renewal of the compulsory provisions of these Acts.

In a letter dated November 30, 1886, written by the Chairman of the Medway Board of Guardians, and unanimously approved by that body, to the principal medical officer of the district—who had requested information for the general commanding as to whether the local authorities were inclined or proposed to take any steps for continuing the use of the lock hospital at the expense of the ratepayers—the following points are noticeable :—

" While deeply regretting the immense harm done to the community by the abrogation of the Contagious Diseases Acts, the guardians feel that from various causes it would be inadvisable to continue the hospital, which in their opinion would be comparatively useless without those compulsory powers of admission, and detention which constituted the very pivot of the numerous benefits which resulted from the quiet unobtrusive working of the late Acts, as without such powers many women sent from other parts of the district would leave the hospital before being cured, and would remain in Chatham to intensify the evils from which the town is at present suffering."

In conclusion, the guardians expressed deep regret at the mistake made in the abrogation of the late Contagious Diseases Acts.

On March 16, 1886, Canon Jelf, the then Rector of Chatham, wrote a letter which was quoted in the House of Commons by the late Mr. Cavendish Bentinck. This letter stated that since the suspension of the Acts the following results noted by persons well qualified to judge had occurred :—

1. An increase of juvenile prostitution.
2. An increase of illegitimacy.
3. An increase of physical disease in its worst form.
4. Solicitation in the streets more frequent.
5. Many respectable girls are not deterred as formerly.

Thus far my remarks have tended to show that since the repeal of the Contagious Diseases Acts, there has been a general increase of prostitution in the district; now for the effect of this increase. With regard to the amount of disease existing amongst prostitutes, at present no exact data can be obtained, but there is no doubt that it is very considerable. Many of these women when they become too ill to any longer ply their trade, seek refuge in the Medway Union Infirmary; but as soon as they are a little better they go off again, and will rarely stay sufficiently long for a cure to take place. As further bearing on the assertion that juvenile prostitution has increased, it is no uncommon

thing for girls of 14 or 15 years of age to be under treatment in this institution both for gonorrhœa and for primary syphilis.

It is my experience, and also the experience of many of my brother practitioners, and of chemists who do a prescribing trade, that since the repeal of the Contagious Diseases Acts, there is a much larger number of cases both of gonorrhœa and of primary sores amongst young men of the civil population.

But the most important information on this head, because it is absolutely unimpeachable on the score of accuracy, is the information supplied by the Army Medical Reports as to the number of admissions from venereal diseases prior and subsequent to the repeal of the Acts; and these reports at once make apparent the fact that the compulsory examination, and detention when diseased, of the prostitute had a most salutary effect on the health and efficiency of the soldier. The statistics which are here appended relate solely to the Chatham district, and for them I am indebted to the courtesy of the principal medical officer of the district.

The Chatham military district includes Gravesend and Sheerness, but since the year 1888 it has included Shoeburyness and Maidstone, and is now called the Thames district.

I have in the accompanying table left out the two last-named places, which only have a few men, and are of no value for comparative purposes. The figures, therefore, relate to Chatham, Sheerness, and Gravesend, which I shall speak of as the Chatham district, and show the ratio of admissions per thousand of strength both from gonorrhœa and primary syphilis during each year from 1880 to 1890, inclusive.

TABLE showing the Number of Admissions, and Ratios per 1,000, from Primary Syphilis and Gonorrhœa in the Chatham District, from 1880 to 1890, inclusive.

Year.	Station.	Strength.	Admissions.		Rates per 1,000.	
			Primary Syphilis.	Gonorrhœa.	Primary Syphilis.	Gonorrhœa.
1880	Chatham	4,031	250	397	62·01	98·48
1881	„	3,784	239	368	63·16	97·25
1882	„	4,103	292	416	71·16	101·38
1883	„	3,002	253	309	84·30	102·90
1884	„	3,150	445	420	141·30	133·30
1885	„	3,395	461	361	135·80	106·30
1886	„	3,334	304	314	91·18	94·50
1887	„	3,511	327	387	93·14	110·23
1888	„	3,710	357	382	96·12	102·97
1889	„	3,497	365	342	104·37	95·07
1890	„	3,777	346	305	91·60	80·75

The average ratio of admissions for primary syphilis during the four years, 1880–83, was 70·16 per 1,000 of strength; whilst the average for the next period of four years, 1884–87, when the Acts were repealed, was 115·33 per 1,000 of strength; or if we take the seven years succeeding the repeal of the Acts, we find the average ratio to be 107·66 per 100. In the one case there is an increase of 45·17 per 1,000, and in the other an increase of 37·50 per 1,000.

The average ratio of admissions from gonorrhœa during the four years, 1880–83, was 100 per 1,000 of strength, and for the next period of four years, 1884–87, was 111·08, or for the seven years succeeding the repeal of the Acts 103·30 per 1,000.

The admissions from gonorrhœa have been of a much more fluctuating character than the admissions from primary venereal sores, and, generally speaking, gonorrhœa does not seem to have been so readily affected by the Acts. Another reason is that a very large number of men who contract gonorrhœa do not come under the observation of the Army surgeon, but are privately treated at chemists' shops or elsewhere. In a paper read before the Statistical Society in January 1891, on the operation of the Contagious Diseases Acts, the statistical aspect of the question is fully entered into, and, as my paper is based purely on local experience, I have preferred to confine my figures to local results. It is evident from the above statement that when the compulsory clauses of the Contagious Diseases Acts were withdrawn in 1883, there was a great increase in the number of admissions in the military hospitals, an increase which was due to the increased amount of disease amongst prostitutes consequent on the withdrawal of the benefits conferred on this class of women by the State Lock Hospital. It may be said by opponents of legislation for this class of disease, that the tremendous increase of disease amongst soldiers which immediately followed the repeal of the Acts was not continued, and that at the present time the figures are smaller than in that period; but, although the figures are smaller, still the lowest ratio is considerably higher than the highest occurring before repeal, and I believe the true explanation of this decrease is to be found in the fact that there is more clandestine prostitution, more seduction of young girls—in fact, immorality is not confined to *bonâ fide* prostitutes. Girls who, as I have said previously, were deterred by the Acts, now frequent music-halls, public-houses, dancing saloons, and other questionable resorts, and the consequence is that although they do not in many cases openly practise prostitution, still they are not virtuous; and the fact of there being more unchecked immorality in the town prevents many of the men from associating with the *bonâ fide* prostitutes, with the result that while there is thus a lessening of disease there is a considerable increase of general immorality.

I do not think that even the most determined of the opponents of the Contagious Diseases Acts can gainsay the connexion which undoubtedly exists between their repeal, and the increase of non-efficiency amongst the military from venereal disease; and in the main these statistics are

probably a fair indication of the amount of disease among the celibate portion of the civil population.

One objection to State interference with this class of disease is that it is legalising vice, and as it were encouraging men to immorality from a knowledge of the fact that certain women of loose character were officially sanctioned free from disease; but even if this assertion were true, and I do not think it is true, it is equally true that the Acts had a deterrent influence on many females, preventing them from leading immoral lives, and that they had a decided influence for good both on the manners and habits of the class of women who were brought under their operation.

Then, again, there is another objection, that we are interfering with the liberty of the subject; but if prostitution is a dangerous calling, and nobody denies that it is, then it is quite as reasonable to safeguard such a calling by proper control as it is in the case of any other dangerous trade. Let me here remark that I am no believer in the possibility of stamping out prostitution, which has always existed, and always will exist; and while granting that much may be done by means calculated to promote continence, such as the influence of pure literature, the assiduous cultivation of the bodily and mental powers, and the practice of temperance, still over and above the moral evils of prostitution there are graver ones of a physical character, which not only affect the health of the present generation, but become a serious legacy to succeeding generations; and it is our duty as sanitarians, in the interest of the public health, to point out these dangers, and to use our influence in order to obtain some measure of State control which will render it as penal for a woman to ply a dangerous calling, when suffering from a loathsome disease, as it would be if she exposed herself in the streets when suffering from small-pox or scarlet fever.

We have recently had Acts for the compulsory notification of various infectious diseases, and these are diseases in which as a rule one attack confers immunity for the rest of life. In this respect they resemble syphilis; but the latter disease is far worse in its effects than any of the diseases alluded to, because not only does its power of spreading and of developing fresh symptoms remain when the initial lesion is past, but it is a malady capable of hereditary transmission, while its effects are often spread over a period of many years affecting every organ and tissue in the body; and I submit that on the ground of prevention of disease alone it is our duty to protest against the present method of doing nothing to check the ravages of a disease so far-reaching in its effects.

To sum up the experience of Chatham, where we have had the great advantage of comparing results as to the effect of State regulation of venereal disease and of the absence of such regulations, the following points present themselves:—

1st.—That the effect of the repeal of the Contagious Diseases Acts has been to largely increase the number of prostitutes, and especially of juvenile prostitutes.

2nd.—That the general character of the women is worse.

3rd.—That a very large number are diseased.

4th.—That the amount of venereal disease in the garrison has increased; and that although exact information is not obtainable, there is strong presumptive evidence that disease is more rife amongst the civil population.

With these facts before us there is little difficulty in coming to the conclusion that whatever moral objections might be raised to a State regulation of prostitution there can be no objection to it as a measure of sanitation, and it is chiefly on sanitary grounds that the question is discussed at a gathering of this description. We are met here not to enforce morality, but to prevent disease, and I am strongly of opinion that State interference is necessary both in the interests of present and future generations. From my own observations on the working of the Contagious Diseases Acts I saw nothing to object to, and should welcome their re-enactment, being convinced that they were right both morally, religiously, and hygienically.

Before their introduction in 1862, it was publicly stated by the then rector of Chatham, the late Canon Joseph, that there were over 300 women on the town. In June 1882 this number had been so reduced that there were only 153 on the register.

A lady who has taken great interest in rescue work, and who was allowed to visit the Lock Hospital whenever she chose, wrote as follows, alluding to the working of the Acts:—

"Many girls were rescued, and those who returned to their old way of life were more decently conducted and of improved demeanour. The provisions of these Acts brought influences to bear on a class which could not be reached in any other way, because many of these women, even if found, were often in a state of semi-intoxication, which makes appeal fruitless. Under the calm restraining influence of hospital life, many, who at first were bold and defiant, became gradually more sobered and docile, more ready to listen to appeals, and to embrace means of leaving their hateful mode of life."

These remarks show that not only were the Acts beneficial to the health of the community, but that the welfare of the unfortunate women was promoted by them; and in connexion with this phase of the subject, I may here remark that at the Chatham Lock Hospital alone during a period of 14 years 835 women were reclaimed.

Now that we have the Criminal Law Amendment Act, I am of opinion that both it and a Contagious Diseases Act would be mutually strengthened if worked conjointly, and in conclusion I would suggest the following points on which it is especially desirable to legislate.

There should be a legal supervision and restriction of prostitution.

Special hospitals should be erected and maintained for the treatment of venereal disease; or (as would be possible in many cases) portions of existing institutions, either poor law infirmaries or voluntary hospitals, might be subsidised in the districts where soldiers are most numerous, and in large centres of population.

Above all, re-introduce compulsory examination and detention of prostitutes when suffering from venereal disease.

DISCUSSION.

Dr. Routh contended that the reports were "cooked," and that some 10,000 boys were included among the 20,000 able-bodied soldiers. The navy reports also were inaccurate. Juvenile depravity increased owing to bad example. The effect of frightening the women who were prostitutes was to increase clandestine prostitution. In Paris there were 7,000 or so registered and 30,000 clandestine prostitutes.

Brigade-Surgeon Harvey said that as regarded the British Army in India the latest figures, those for 1889, showed that 474 per 1,000 of the men had suffered from venereal disease, and 36·14 per 1,000 had been constantly in hospital, showing an increase of 13·32 per 1,000 on the average of the preceding five years. Hence, on a strength of 42,000 men, 559 had been put permanently into hospital by the abrogation of the Acts. At Peshawur in March 1890 he found that the authorities had let the hospital remain empty for 15 months, and had practically given up attempting to combat disease. Seventy per cent. of the men in hospital were suffering from venereal disease, but by inducing the diseased women to come to hospital the proportion had now been reduced to 23 per cent.

Dr. Charles Drysdale (London) said that the Army statistics were valueless, because they were based on the idea that primary syphilis and venereal sores were synonymous. This was as fallacious as if small-pox and scarlet fever were lumped together. In Paris, and quite recently in Hindostan, primary syphilis had been separated. Secondary syphilis, the only really important venereal contagion, had, according to the Army statistics, risen, as it had in Paris and wherever Acts similar to the late English C. D. Acts were in force. Thus, in Chatham, between 1884 and 1889 whilst so-called "primary venereal sores" had fallen 32 per cent., secondary disease had risen 86 per cent.; and in Paris, whilst soft sores had been affected by police examination, hard sores and syphilis had risen. He would advocate that syphilis should be notified like other infectious diseases. After this, all persons who knowingly communicated the disease to their neighbour should be prosecuted criminally; if unknowingly, a fine should be inflicted.

Inspector-General Lawson asked if Dr. Drysdale could give such a definition of simple non-infecting sores as would enable the authorities to separate them with certainty from the infecting. Until that was done the distinction would only obscure the question. Dr. Nevins had jumbled up facts and figures which had frequently no connexion with one another. They had been familiar to him (Dr. Lawson) for years, but were unworthy of confidence.

Brigade-Surgeon R. Pringle stated that the C. D. Acts only held out a false security, and, in places that he named, from the disgraceful manner in which they were carried out, one of the diseases they were designed to prevent was actually produced. No medical officer could give that guarantee of safety which was required without spending time over the case, which would necessitate a staff for the purpose. The working of these Acts at Chuckrata Dr. Pringle summed up here, as he once did officially, by saying that "it was hard to say whether decency or sanitation were most outraged."

Mrs. Josephine Butler said that if the discussion had been confined to the question of physical health she would not have ventured to say a word, although the statistics interested her, as proving that the laws

of hygiene read truly always eventually follow on the lines of the moral law; but Mr. Holroyde had spoken of hospitals and the rescue of women. She did not object either to hospitals or to rescue work, and had had a good deal to do with both. What she did object to was the compulsory and degrading treatment of women who were, under the C. D. Acts, made chattels, not human beings. Women had by their own efforts won victory after victory over this kind of legislation. Its partisans might rest assured that they would not succeed in their attempts to revive it. They would have to work under an increasing fire of opposition from the women of the whole world, who would never relax their vigilance. Women were numerically as strong as men, and morally they were stronger.

Dr. Chapman (Paris) said that Mr. Holroyde had entirely ignored the array of authoritative statistics which confuted every point he had raised. The alleged increase in clandestine prostitution at Chatham after the abolition of the Acts he believed to be a misconception. In Paris all women who practised prostitution were registered, and as they detested the system, and also the police tyranny, it was reasonable to suppose that they would become clandestine. Such was the fact, and it was a direct result of the tyranny of the system itself. About 4,000 women were on an average registered in Paris every year, nearly half of whom escaped the police as soon as possible, and had to be replaced by a fresh 2,000 captured to take the place of the fugitives.

Mr. Henry J. Wilson, M.P., said that no attempt had been made to refute or explain away the facts and figures and diagrams of Dr. Nevins, which demonstrated the uselessness of the Contagious Diseases Acts. Mr. Holroyde's paper was full of proposals to deal with women, and women only, and to this Mr. Wilson objected on behalf of the fathers and husbands and brothers of the women of England. But Mr. Holroyde did not say what the local authorities had done to cope with the evils they complained of. Why had they closed the hospital without trying the effect of the voluntary system? How many brothels had they shut up, or tried to shut up? How many prosecutions had they instituted under the Criminal Law Amendment Act in order to stop the seduction and prostitution of young girls? From Mr. Holroyde's silence it must be inferred that no effort whatever of this kind had been made. As regarded the alleged condition at Peshawur a few months ago, he declined to accept verbal statements which he could not verify, while their opponents shirked dealing with Dr. Nevins' figures, taken from sources accessible to everybody.

Dr. Berdoe (London) had made it his business to satisfy himself as to the origin of many cases of syphilitic infection, and he had come to the conclusion that the false security offered by protected towns was responsible for the actual propagation of syphilis.

Mrs. Annie Besant said that these diseases were unknown in India as a common scourge until introduced by western conquerors. The demand was now to debauch Indian women in order to make English conquerors safe. Hindus loved and honoured women, and the result of this outrage, if carried far, would be to stir up a mutiny, beside which the last would have been child's play, and in which the conscience of the civilised world would be on the side of the Hindu. Opponents of the Acts were told that they must show how to check the spread of disease, and that prostitution was a trade that would last as long as the world. The

way to stop disease was for men to be chaste, instead of sacrificing women to their lust. Prostitution should not last; women, educated women, now were able to use pen and tongue; they identified themselves with these fallen women, their own flesh and blood, and they would form a barrier round them through which men's passions should not break, to outrage and destroy.

Dr. Nevins, in replying, said that, as to the alleged increase of juvenile prostitution, &c. in Chatham, in consequence of the repeal of the C.D. Acts, there was not a word in the Acts in the direction of stopping prostitution, juvenile or otherwise, or of reclaiming women or preventing immorality, except the provision of a chaplain while the women are in hospital. The Chatham people did nothing to reduce juvenile prostitution while the Acts were in force, for the numbers were as great at the end of the time as previously, and as to the reclamations, 97 per cent. of all the women went back to prostitution direct from the hospital. As to disease being increased by repeal, it had steadily risen among the registered prostitutes under the Acts from 120 cases yearly among every 100 women at first, to 169 per 100 women for the last three years of the Acts. In India disease under the Acts (which were far stricter than the English Acts) rose from 171 per 1,000 men to 389 per 1000 men in 13 years of full Acts, and now it was said that the repeal of these Acts had produced such an increase of disease!

Mr. Holroyde also replied.

The Teaching of the Laws of Health in Schools.

BY

ARTHUR NEWSHOLME, M.D., D.P.H., Lond., Medical Officer of Health for Brighton.

Medical officers of health and sanitary inspectors are now appointed in every district, whose duty it is to enforce every precaution against the spread of disease and the removal of local conditions which tend to occasion disease. For this purpose various Acts of Parliament exist. Their enactments cannot, however, be enforced without the cordial support of the local authorities, which are elected by the public, and are, in fact, a reflex of public opinion. It is evident, then, that in order to ensure steady sanitary improvement, the public must be educated up to the necessary point.

How to reach the public.—Without doubting the desirability of popular instruction in hygiene for adults, and especially for women, I am convinced that our main hope for the future lies in the education of the children, of whom the major part are in attendance at elementary schools, voluntary or board. Twenty per cent. of the total population is on the registers of public elementary schools, and it is evident that if each of these scholars received an elementary course of instruction in

the laws of health, in comparatively few years an immense amount of useful knowledge would be diffused, which must have a most beneficial influence on the future of this country.

Economical aspect.—Most persons can appreciate an appeal which is made to monetary considerations; and even on this ground it can be shown that the present lack of knowledge of sanitary matters on the part of the public is the cause of serious loss to the community. Although the days when infection was regarded as a mysterious visitation, for which fasting and humiliation of spirit were the remedy, and not isolation of the patient, are nearly gone, yet every medical officer of health meets daily with cases in which nothing but gross ignorance can account for culpable indifference to the spread of infection. During 1890, 6,537 cases of scarlet fever were admitted into the hospitals of the Metropolitan Asylums Board. These probably represent about 62 per cent. of the total number of cases of this disease occurring in London. As each case of scarlet fever costs on an average 1*l.* 4*s.* 9½*d.* per week for maintenance in hospital, and as a majority of the cases would have been avoided had the early cases been isolated at the first onset of the disease and kept isolated throughout, it follows that a large proportion of the 56,722*l.*, which was spent in the medical treatment and nursing of these cases of scarlet fever might have been saved. The amount spent in the treatment and isolation of this one disease in the whole of England and Wales, during the year 1889, cannot, on a moderate estimate have been less than 383,474*l.* And yet scarlet fever is the disease in which, perhaps, more than in any other, except small-pox, the importance of precautions against infection is realised by the public. In measles, whooping cough, and diphtheria, carelessness is general, and the loss of life and the expenditure of money which result from this carelessness are enormous.

Hygienic aspect.—We are all familiar with the great saving of life that has occurred during the last 15 years from the lowered death-rate which has prevailed; a saving of life which has occurred chiefly at the useful periods of life, and which is undoubtedly due in a very large measure to the improved conditions of life which have followed on sanitary reforms. That we have not reached the limit of possible improvement is evidenced by the large number of deaths from infectious diseases and from tubercular diseases which still occur, but which are entirely removable by isolation of the infected sick, and by the avoidance of overcrowding and dampness. Perhaps one of the most fertile causes of disease is the improper feeding of infants. The story of the ravages of rickets, a purely dietetic disease, has not yet been completely unfolded; but it is known to be directly or indirectly one of the commonest causes of deformity, disease, and death among children. Infantile diarrhœa, which each summer causes a large wave of mortality, is chiefly due to contaminated food; and this, like rickets, might be almost abolished from our list of diseases, if instruction in the laws of health were given in our schools, and subsequently carried out in practice. Many other instances might be given, but time will not permit me to enumerate them.

The saving of life which is still possible by a more general knowledge and application of the laws of health is not the only gain which would follow. The avoidance of sickness is, perhaps, even more important than the saving of life, especially when viewed from an economic aspect. We often hear it said that the diminished loss of life from epidemic diseases is far from being an unmixed good, for weakly children who would in former days have died, now survive to drag on a miserable existence, and lower the general average of health in the community. This statement is altogether erroneous; for, in the first place, epidemic diseases by no means exclusively or chiefly attack weakly persons; and in the next place, this line of reasoning entirely overlooks the essential fact, that for every person killed by an infectious diseases, there is a much larger number who survive, but whose health is permanently impaired to a serious extent. There are maimed in the battle of life, as well as killed, and by diminishing the number of the latter we, to an even greater extent, diminish the number of the former. There is still an enormous amount of sickness and mortality in this country, which might be prevented by the practical application of the laws of health in daily life; an end for the attainment of which I can see no more certainly and permanently efficient means than the instruction in the laws of health of the senior scholars in all our schools. Let us examine to what extent this is already being done.

What is being already done.—It is possible that in isolated instances instruction in the laws of health may be given, of which we have no record, though it is fairly certain that this is not done to an appreciable extent. Hence, we may take the instruction given in connexion with the Education Department and the Science and Art Department, as a measure of the total instruction in this subject given in Great Britain. I need not stop to discuss the value of the examination test of knowledge, which is made by each of these departments, though I have a strong personal opinion that, notwithstanding its drawbacks, the test by examination is the best hitherto devised, and is, in fact, the only practicable test. Now, the Science Department examines persons of all ages in hygiene; and, as an assistant examiner in this subject, I am able to speak with some knowledge of the good work which is thus being done. But the total number of candidates in this examination, from all parts of Great Britain, is as yet under 5,000 a year; and it is evident, therefore, that the effect upon the community of the instruction thus tested must be somewhat limited in extent.

We may next take the instruction given in hygiene in elementary public schools. The annual return of the Education Department shows that while 88,354 scholars were examined during 1890, in the various specific subjects enumerated below, only 611 were examined in "other subjects," a heterogeneous group which includes book-keeping, German, hygiene, social economy, and Welsh. The number embraced under this group who were instructed in hygiene may be summarised from the fact that under the London School Board hygiene was only taught in one single school, the number of passes obtained being 14.

Number of Scholars Examined in various Specific Subjects in the Elementary Schools of England and Wales during 1890:—

Algebra, 30,035; Euclid and mensuration, 977; mechanics, 11,662; Latin, 360; French, 7,232; physiology, 15,842; botany, 1,830; agriculture, 1,228; chemistry, 2,007; sound, light, and heat, 1,183; magnetism and electricity, 2,293; domestic economy, 23,094; other subjects, 611; total, 88,354.

The number of scholars examined in chemistry was 2,007.

The number of scholars examined in animal physiology was 15,842.

The number of school departments in which boys were taught musical drill was 1,414.

The number of departments in which girls have received instruction in cookery classes was 1,554.

The number of girls examined in domestic economy was 23,094.

Chemistry and physiology may be so taught as to have practical utility in daily life. It is only right to state, however, that the syllabus in physiology is such as ensures the maximum amount of technical detail and the minimum amount of instruction in the vital functions of the body and their bearings on health. Cookery is an important branch of hygiene, and one can only regret that so small a percentage receive instruction in this important subject.

Apart from making the laws of health a compulsory subject of instruction in schools, it would be voluntarily taught to a much greater extent than at present were the teachers themselves taught this subject. I am aware that the official answer to this is that female pupil teachers and candidates in training colleges must pass examinations in domestic economy, and that for male candidates school hygiene is included in the syllabus of school management. These examinations are, however, much too incomplete and imperfect to meet the requirements of the case. Students resident in training colleges are taught one or more of the following science subjects:—Agriculture, physiography, mechanics, sound, light and heat, chemistry, electricity, botany or animal physiology; and the result is that they choose out of this list the specific subject for their scholars. If hygiene were once raised to the standard of a compulsory subject of study in training colleges for both males and females the battle would be won, and we should speedily find that instruction in the laws of health would become general in the elementary schools. Even before entrance to the training college the study of hygiene appears at present to be specially discouraged. It is one of the rules of the Education Department that a previous success in one or more of the list of science subjects just given entitles candidates on their examination for admission to a training college to a certain addition to their marks, and helps to raise their relative position in the "scholarship list." Hygiene is conspicuously absent from this list, and if a candidate were to pass in hygiene it would in no wise help his position. It is evident that this state of matters urgently calls for improvement.

To sum up: having regard to the facts that at the present time there is an enormous amount of preventible sickness, with its concomitant pecuniary loss and distress; that the chief cause of this waste of life and money is the ignorance and apathy of the general public in hygienic matters; and that little is being done at the present time to ensure that the next generation shall be lifted out of the present state of ignorance,—I venture to urge: (1.) That the study of the laws of health should be encouraged, and if need be enforced in all schools. (2.) That as a preparation for this all teachers should be required to undergo a course of instruction in the laws of health. In conclusion I append a scheme of a course of instruction in the laws of health for use in schools. It will be noted that in this scheme I have attempted to interweave physiological facts and their hygienic applications. Unless hygiene is taught on a scientific basis, the instruction given must be superficial, easily acquired and easily lost. The only sound practical knowledge is that which is founded on scientific theoretical principles. Hence, although the introduction of technical terms is to be deprecated in the teaching of physiology for this purpose, I am convinced that in all useful teaching of the laws of health the elements of physiology must bear an important part.

Syllabus of Proposed Course of Study.

A. Preliminary review of chemical facts and of general structure of the body. B. The blood and its circulation. C. The digestion of food:—1. The process of digestion. 2. The varieties of food. Animal and vegetable foods, vegetarianism, milk and its derivatives, mineral foods, condiments. 3. The preservation and cooking of food. 4. Beverages—tea, coffee, alcohol, &c. 5. Water—sources of water, contaminations of water, purification of water. D. Removal of impurities—(1) Respiration—Structure of respiratory organs, mechanism of respiration, chemical changes produced in the blood, and in air; composition of air, impurities of air, importance and methods of ventilation; (2) The skin and kidneys—structure and functions of the skin, importance of cleanliness, baths and bathing; (3) Ash refuse and sewage—the essential points of house drainage, use and abuse of ash-bins, &c. E. Maintenance of warmth:—(1) Clothing—relative value of different materials, requisites of clothing, injurious fashions; (2) The house—means for securing its dryness; lighting and warming of house. F. Personal hygiene—exercise, rest and sleep; habits. G. Local conditions affecting health—climate, winds, varieties of soil, drainage of soil, aspect and elevation of house. H. The immediate treatment of wounds and accidents.

When distributing the prizes at a large girls' school some time ago, the Bishop of Manchester said, "I would have domestic economy, "hygiene, and physiology taught as part of the ordinary curriculum "of every girls' school." That remark, I heartily endorse. It is a matter for congratulation that those subjects are being included in the prospectuses of many of our leading girls' schools in England.

The Privy Council on Education, by the encouragement they are giving to technical education, are doing something for girls attending board and other public elementary schools. Direct practical teaching by trained qualified teachers is given in laundry-work, cookery, and needlework. Theoretical teaching is also given in domestic economy and hygiene. In the latter subjects, the teachers give some proof of their theoretical knowledge by passing either the Queen's Scholarship or Government Certificate Examination in domestic economy, or the Science and Art Department examination in hygiene. In the residential training colleges for female teachers a certificate must be signed by the lady superintendent of each college, stating that each student has done some practical domestic work during the year; but from my large experience in training large classes of students, I am in a position to say that the students, in many cases, do not take much interest in the performance of this practical work. It may be that the reason is because no ambition to excel is excited. All their other practical work is tested by examiners and inspectors, the needlework by a lady expert, cookery by an inspectress. Would it not be well if the students knew that their domestic and hygienic knowledge would be also tested by a competent inspectress? Such an arrangement by the Privy Council might have the effect of further promoting the cause of hygiene among the masses by means of the female teachers. No means, however small, should be neglected for getting at the masses. In the past, many thousands have been sacrificed upon the altar of ignorance—ignorance of matters relating to sanitation, diet, fresh air, cleanliness. Those days of actual ignorance have passed away, we hope, for ever. But the awakening is not yet universal.

Public Organisations for promoting Hygiene.

Women anxious to do something in this direction have formed "Ladies' Sanitary Associations," and have done valuable work in particular districts, but the matter is a serious national one.

Recognising this, the National Health Society was formed in London some years ago for the diffusion of sanitary and hygienic knowledge among all classes. The work of the society has been growing until it has succeeded in reaching all classes, from the highest downwards. Its teaching is given in the drawing-rooms of duchesses, and in the homes of the very poor. Its secretary, its officers, and most of its lecturers are women. Down into the very poorest districts of London, away into rural villages, the cottages of labourers, outlying school-rooms and farmhouses, they carry the information and practical knowledge which is listened to with eager attention; and not only

listened to,—again and again, have the lecturers found their suggestions and hints being acted upon. We talk to the women in simple language, and they tell their difficulties, and ask advice from the lady who talks to them in such a homely way. As an illustration from personal experience, I may say that after the last such "homely talk" (I will not say lecture), given by myself in Whitechapel, quite 60 out of the nearly 200 extremely poor women present remained behind to ask questions. It was quite pathetic to see how the desire to know how the home may be made and kept healthy exists. I noted specially that the questions nearly always included something about drains. These poor creatures do not know that the best drains are those which require no disinfectants. They do know, however, that they have something called "drains," and they calmly accept the idea that, being drains, they must emit a bad smell, and so they begged, "Please will you write down the name of that stuff for drains." The Committee of the National Health Society are not only national in name, but are national in spirit, and their influence has spread to many parts of the country. They would gladly carry their humanizing work throughout the length and breadth of the land, but they need such local co-operation as has been recently given to them by the County Council for North Devon, by whose arrangement the society sent 15 of their lady lecturers, during May, June, and July, through the county to teach cottage cookery, and the simple means for maintaining a healthy existence. The enthusiastic work of these ladies and their sympathetic and homely method of dealing with the ignorant poor have already produced large results in the increase of home comfort in the Devonshire villages. Paley said, "Virtue is the doing good to mankind"; surely women, who by their teaching are raising the material and moral standard of their fellow creatures, exemplify this.

It is only fair to mention that there are other paths in which, if opportunity were given, women's work in the cause of hygiene might be extended so as to prove of immense practical value. I refer especially to the work which they could perform as Inspectresses of Factories in which women and children are employed. That women's workshops cannot be really efficiently inspected by men is a serious fact;—a fact which has been realised and officially recognised in the United States of America, where women are now employed as Inspectresses. And certainly women's patience in attending to small details might be used to great advantage in probing the evils which are only too prevalent in some of the "sweating" dens of London.

In conclusion, let me once again refer to and emphasise the necessity for that co-operation which is the basis of success when the greatest good for the greatest number has to be considered, the co-operation of men and women. Men, as they should be, are the pioneers of sanitary and hygienic reform; but they may sit in council, they may originate schemes, they may bring legislation to their aid, and they will find that most of their efforts are as a sounding brass and a tinkling cymbal, if they enlist not the sympathies and aid of women. When women are informed and interested they seem to be by nature sanitarians,

and, as Dr. Benjamin Ward Richardson has said, they are allies of the first order; but when not informed and not interested, they are silent opponents which no man or sanitary board can withstand. Though not themselves eligible for seats on local sanitary boards, in women's hands the health of the nation lies. May we not hope that the impetus given to the cause of health by this Congress will be instrumental in stirring up those women of England who may not yet have realised the responsibilities which are theirs—theirs by right—responsibilities which may be classed, indeed, as the highest privileges, and the noblest of all women's rights, the exercise of which will beneficially affect, not only their immediate circle, but humanity at large. As my paper deals primarily with women's work in promoting the cause of hygiene, I may, perhaps, be pardoned for substituting the feminine for the masculine gender in my concluding words:—

"Women never nearer to the goddesses attain,
"Than in the art of giving health to men."

The Need for Popular Instruction on Hygiene and Physiology.

BY

WILLIAM BRUCE, M.D., LL.D., Medical Officer of Health for Ross and Cromarty.

I believe it will be admitted that in no part of Great Britain is the knowledge of the laws of health so rudimentary as it is in the Island of Lewis, in the county of Ross and Cromarty, of which I have the official charge in public health.

Notwithstanding this degrading ignorance, the health of the inhabitants is fairly good. The death-rate per annum, in a population as per last census of 1891, stands at about 120 per 10,000 and the average mortality of preventible disease—in the sanitary sense, that is, of tuberculous and zymotic disease—is the second least in Scotland. This latter statement is merely approximate, as three-fourths of the deaths are not certified by a registered practitioner, and must be, in many instances, mere guesses on the part of the relatives of the deceased. The low rate of mortality must not, however, stand in the way of undoubted sanitary progress, and falls to be accounted for by—(1) a high standard of morality; (2) racial characteristics; (3) absence of pressing poverty; (4) healthy outdoor life; and (5) it must be allowed, idleness, the natural state of man viewed as a mere animal. I may be allowed to state here parenthetically that the observation of 33 years' medical practice has firmly fixed on my mind that constant physical exertion does considerably shorten life; that work wears out in time the moving portions of the machine,—first, and chiefly, the heart.

I shall now give a few brief extracts from the district report of my friend, Dr. Macaulay, of Lochs:—

"The average crofter-fisherman's house is a parallelogram from 50 to 60 feet long and 12 to 13 feet broad inside. The thick walls, which are generally 5 feet high, are built with loose stones and packed with earth. The roof is covered with turf and thatched with straw. Where possible the house is built on a gentle slope, so that the wall of the one end may be from 2 to 3 feet deeper than the wall at the other end. This is the dwelling-house and cow-house in one. The family occupies one half, and the cattle the other half. A person entering such a house about the end of May will notice that the floor of the cattle-half of the house is from 2 to 3 feet lower than the floor of the family-half of the house. This forms the receptacle for the year's dung, fish offal, and any other refuse about the house. In the beginning of winter the cattle are stabled in this underground receptacle. As it gradually fills with the dung and other organic matter, the cows are raised up until by the month of March the dung on which they stand is frequently a foot or more higher than the level of the floor in the family end. This dung is never cleaned out of the house until it is required in the month of April for potato manure."

You will think how miserable and shameful! This state of matters must be remedied at once. Note, however, that the population, as I have shown, is healthy as a whole, and that there will be difficulty in procuring the money for improvements; that the habits of the people have been long established; that their miserable crofts are dependent on the manure, yea, on the soot which must be kept dry and under cover in so terribly wet a climate; and, above all, bear in mind, that the people are ignorant and bigoted in their own beliefs, and you will see that any violent measures of reform will only defeat the end in view.

Are we sanitarians, then, to do nothing? Yes, we can do a great deal if we begin at the beginning, at the schools. But before proceeding further, let me ask, which is the first article of faith in personal hygiene? I cannot doubt that the answer will be personal cleanliness. If we could secure this one condition in its fullest aspect, the whole army of sanitarians might be pensioned off, and no more appointed. The problems in the Lewis are mainly individual, as distinct from social, problems. I speak of things sanitary, of course, but I doubt if I am not correct in the wider and more general sense. Townships are really aggregated rural communities. A township embraces in many cases a great number of acres. This, then, being the real question, viz., one of cleanliness, it must be taught as the first article in the hygienic catechism of schools. How far is it possible so to educate the children there? Are there the means of demonstrating; are there the teachers?

I have personally investigated on the spot the apparatus, so to speak, and I find it lamentably defective. Will it be believed that hundreds of pounds have been lavishly spent on buildings, in some cases half a mile away from a source of pure drinking waters, and that no

proper and sufficient means have been resorted to to obtain a water-supply for such a school and its pupils numbering, it may be, hundreds?

In the county of Ross and Cromarty, fully one-half of the public schools have no proper water-supply. Just think of that pregnant fact, and consider the probable sanitary condition where so many children are compelled to spend a large portion of their lives.

The privy accommodation is often constructed on bad lines, and, as a rule, the emptying is done at long intervals, and the receptacle and its surroundings are badly kept. Urinals are almost always ill-planned, and no attention paid to them whatever. Such conveniences are a necessity for very young girls.

An abundant supply of water is first of all needed. Then water-closets may follow, but, as a rule, privies, for obvious reasons, must still remain; and lavatories, and by-and-by, baths must follow. In the meantime privies must be constructed on proper principles. They must be situated in the right place, not too near the schoolroom or teacher's house, and hidden away if possible, but yet accessible.

In some cases the children are absolutely shut out, so that these receptacles may not become a nuisance but may be in proper order against the inspector's annual visit. In others for divers reasons, but principally because they are too obtrusive, the children do not take advantage of them. All this must be remedied.

And now we come to the second desideratum—the absolute and imperative need for steady, systematic supervision. The schoolmaster must consider the practical enforcement of sanitary work in his school as a most important portion of his duty. The way to secure this devotion of his time and attention is to make it pay to do so. A certain proportion of the Government grant should depend on (say) quarterly reports made by the district medical officer of health.

The teacher ought to look upon his school and its economy as a wise householder looks upon his or her house. Miss Nightingale lays it down as a rule never to be broken that every housekeeper should every day inspect every part and corner of her establishment. So should every schoolmaster who has once grasped the idea that he—more than anyone except the parents—has in his hands the moulding of the moral and individual character of his pupils.

To teach with interest and advantage it will be necessary that the teacher himself be well versed in the knowledge of physiology and hygiene. Both must be studied practically, but especially the latter. At South Kensington and elsewhere classes are doubtless formed to suit the period when schoolmasters are free to attend. Having thus become fitted, he must put his knowledge into practice. Nowhere is ventilation more important than in schools, and yet, in too many instances, are the simple rules too often neglected; and so also with regard to heat. There is frequently deplorable ignorance displayed in this respect.

In working out hygienic rules in schools, teachers must trust a good deal to some modification of the monitor system. Ordinary immorality,

so-called, is, I have already said, rare in Lewis. But "the quality of "mind must be low where dirt and filth abound, and the disposition to "grovel leads to idleness and fatalism." Civilization will follow more closely and steadily in the wake of the schoolmaster if he cultivates the graces both of mind and body in his pupils, and if his motto be "Nihil est quod humanum a me alienum puto."

Hygiene for the Zenanas of India.

BY

Surgeon-General C. R. Francis, M.B., M.R.C.P., Delegate from the National Indian Association.

More than 20 years ago Miss Carpenter, sister of our renowned physiologist, hearing much of the low social condition of the women of India, determined, although then in the seventh decade of life, to go and see for herself, in view to, if possible, its amelioration. She founded, in 1870, the Association,* of which the Princess Alice became the President, and which is now under the patronage of the Princess of Wales. Miss Carpenter, being much impressed with what she saw, viz., amongst other things by the great need for female education and improvement and for better sanitation, paid other visits to India, but died in 1877. Stimulated by her example and exertions, the Association has spared no efforts to carry out her views; branches have been established in some of the principal social and educational centres, an active interest being taken in them by high official authorities; its magazine has been utilised for conveying information on the best means of preserving health in India; and its promoters may fairly be congratulated upon the progressive fulfilment of the objects with which the Association was founded. Following Miss Carpenter's example, the honorary secretary, Miss E. A. Manning, paid a visit to India in 1888, to inspect the several branches, and to bring them more into rapport with the parent institution at home.

Nearly half a century ago, the Government of India tentatively initiated the experiment of sending four intelligent young native gentlemen of good caste to England, to study medicine under the superintendence of one of its ablest medical officers, Dr. H. H. Goodeve. The experiment was eminently successful; and the door being thus opened, other young Indian gentlemen voluntarily came to England, from time to time, for the same purpose. Now they come in increasing numbers to study not only medicine, but various callings which, it is hoped, will, on their return to India, be of use to themselves and to their country. To all who wish to avail themselves of its aid, the National Indian Association is prepared to stand, as it were, *in loco*

* Subsequently called the National Indian Association.

parentis; to provide them with suitable accommodation, to show them the best side of English society, and to introduce them to a knowledge of such institutions as may especially benefit them. It is to be regretted that, in some cases, these gentlemen come too young. And here I would urge that all medical students from India should be encouraged to thoroughly study hygiene.

It is somewhat remarkable that, although the natives of India, the Hindus especially, attach great importance to personal ablution, which is indeed a religious obligation, they do not seem to recognise the necessity for healthy surroundings. The management of the lying-in chamber is a striking illustration of this. Indian mothers look upon fresh air as positively injurious to the infant, and to exclude it as well as the possible entrance of malignant spirits, they take infinite pains to close every door and window, and to fill up every crevice; so that there is a complete absence of ventilation, the room resembling, says Kunye Lâll Dey in his "Hindoo Social Laws and Habits," "an hermetically sealed box." In this darkened chamber—a large fire burning in the centre even in the hottest weather—the mother and child remain, inspiring a vitiated atmosphere for 21 days, till the ceremony of the *Shūsti pūja* is performed. Imperfect ventilation is, indeed, a characteristic feature in all Hindu dwellings. The sitting and reception rooms of a native house in Calcutta intended for the male members of the family are comparatively spacious, as is the *dalān*, or hall for the celebration of the *pūjas* and festivals that take place on the premises. There is also a court-yard for *nātches* and other entertainments. But, in the *untuppoor* (zenana or female apartments), in which the men are apt to sleep half their time away, a very limited amount of breathing space, much less than the quantity considered necessary in a tropical climate, is allotted to each individual. And, in the immediate neighbourhood, are the cooking rooms which have no proper outlet; the *austakoor*, or place to receive their refuse—a kind of dust-bin; odious privies, too often left uncleaned; wells sunk almost directly beneath these privies; the tank for the women who here wash their clothes and themselves; in short, an abundance of impurities, the contemplation of which led a well-known practitioner some 50 years ago to write that it would be difficult to find, in any city, "more fruitful and fatal causes of disease and death concentrated within narrower limits." An improved water supply and better drainage—the sewage of Calcutta is now drained away into the Salt Lakes,* instead of being deposited (as formerly) in the

* The liquid sewage is conducted by a main sewer into the circular canal, whence it is supposed to find its way into the tidal Bidridhuree river (which is practically an arm of the Bay of Bengal), there to be tossed about and finally deposited at high tides in the Salt Lakes, with which the Bidridhuree communicates. The system is considered by eminent medical authority to be very unsatisfactory. The liquid sewage, it is urged, should be made to discharge at a point much lower down—into an arm of the sea which does not communicate with the Salt Lakes, nor with the country near Calcutta. The "dry sewage" (street sweepings, &c.), all that the sewer does not carry off, is conveyed by municipal carts and by railway to an area of municipal land about a mile square, where it is laid down in layers from eight to ten feet in thickness, thus raising the land which originally was very low.

river (the principal drinking water of the city) at the rate of 180 tons a day—have greatly contributed to improve the health of the city generally, notably in the diminution of cholera. But these reforms, though appreciated by the native community, have been introduced by the ruling power; they are not the result of the growth of native public opinion. And I am not aware that, as yet, there is any material difference—so conservative are the people and so indisposed to brook any change that affects the *Ma Bāp ka dustoor* (ancient customs)—in the insanitary condition of the houses, and their immediate surroundings. Let anyone take a walk through the Tiretta *bazaar* (in the northern quarter of Calcutta) at day-break before the inhabitants are astir, and he will probably see men asleep (in the hot season), as I have, on *chārpāis* (country bedsteads) placed in front of the houses, close to, if not directly over, one of the open street drains, which are not always only water drains. Can it be surprising that cholera should be endemic—about 4,000 on an average dying annually in the past? or that the natives should have so little stamina wherewith to resist it? As a matter of fact, 92,520 were swept away by the disease in 20 consecutive years. With improvement in the hygiene of the home, the mortality from this disease would be still further diminished.

We sometimes wonder why our military cantonments, upon the public buildings in which so much money has been expended, should become unhealthy. In some cases there may have been physical objections, perhaps overlooked or insufficiently considered, to the site; or, possibly, other causes beyond human control may have unexpectedly supervened. But, in others, more frequently too than the European authorities are aware of, the unhealthiness is of the natives' own causing. For example, cholera appears in a bazaar in cantonments; and, upon the advice of the administrative medical officer or staff surgeon, a temporary hospital is erected a sufficient distance off from the cantonment for the reception of such cases. But, not unnaturally, the sick do not like to be taken from home, and the occurrence of cases is therefore not reported. The inmates of the infected house "lie close," and the cholera dejecta, instead of being disinfected, removed to a distance and there buried, are either thrown into a corner of the premises or placed in a shallow excavation hurriedly scraped out for the purpose in the immediate vicinity of the house. I have met with a similar case when marching with an irregular cavalry regiment. A trooper, seized with diarrhœa, the preliminary symptoms, apparently, of cholera—had the dejecta buried in his tent.

The amount of crowding in the sick chamber is often excessive. Fresh air, so essential to the prevention of ante-mortem clots (embolisms), an occasional cause of sudden death after surgical operations—is the last thing thought of when such a catastrophe is threatened. In some parts of India, in the comparatively low and damp parts particularly, *e.g.*, in Bengal proper, *phthisis pulmonalis* is not uncommon amongst the women; and without doubt, overcrowding in small rooms contributes to this. Men also thus suffer in the same localities.

The feeding of infants, whose "stunted growth, constant sickness, and early death" is often due, says Kunye Lâll Dey, to the substitution of inferior *meethaees* (sweetmeats) for the mother's milk at the time of weaning, and to the free consumption of immature fruit, is a subject upon which the mothers of India require much enlightenment. About 30 years ago a lecture was given, in Calcutta, by a native gentleman who advocated the use of butcher's meat and alcoholic drinks by Bengalees; urging that, as such a dietary gave strength to Europeans, his countrymen would do well to adopt it. Mistaken counsel! And the increase of liver disease during the past 25 years, amongst the Bengalees and others who have followed it, only too certainly proves its fallacy. The lecturer, who overlooked the fact that Britons owe their superior physique, in the first instance, to a Northern clime, would have given better advice had he recommended his countrymen to adhere to the simple vegetarian diet suitable to a tropical climate, to indulge less in sweetmeats and *ghee* (clarified butter), and to abstain altogether from every description of alcoholic drinks, which tend to *reduce* the strength of Europeans and of all who use them.

How best to counteract the influence of malaria and of impure air and water—the natives are familiar enough with the *effects* of these agents, as is evident from the expressions "*huwa* lug gya*" "*panee† lug gya*"—is another lesson of paramount importance.

The opening, now offered through the instrumentality of the "National Indian Association," for instructing Indian mothers in the laws of health in a familiar and unscholastic way in their homes, as also to girls at school who in due course will become mothers, is one that, if judiciously utilised, may bear excellent fruit; for, after all, the women are at the root of all social reformation and progress.

The Association has acted as a pioneer in originating and quickening the movement for providing skilled female medical aid for the women in the zenanas, into which no medical *man* has ever been allowed to enter, and who were, therefore, hitherto dependent upon such professional assistance as could be obtained from their own sex in India.

This indigenous assistance is now known to be of the worst possible description. The subject having been ably dealt with in the "Contemporary Review" by a medical lady, Dr. Frances Hoggan, the "National Indian Association" took it up. Meetings were held under its auspices; an impetus, fostered by the Queen herself, was given to the project for sending to these poor women thoroughly well taught lady doctors from England, and for educating the native midwives (dhãees). The entire scheme was thus well ventilated, and, at length, through the benevolence of Mr. Ketteridge, of Bombay, supplemented later by that of several Parsee gentlemen, it assumed a definite shape. A hospital for the reception of native female patients was established;

* "The air has struck me."

† "The water has struck me."

and an income, for three years, for two accomplished lady doctors from England was guaranteed.*

The scheme, thus initiated, commended itself to the wife of the then Viceroy, the Countess of Dufferin, who, with the sanction of the Indian Government, and cordially assisted by local authorities and medical officers, and by native princes and gentlemen in various parts of the country, has completed the foundation of a great social reformation.

Provision had already existed for the treatment of women in some of our hospitals and dispensaries; but the doctors have been *men*. Women of high caste—*purda nishins*—(screened from the public gaze) would not avail themselves of it. For these hospitals are being established; and either in them or at home they have now the opportunity of receiving, when ill, the best possible professional treatment at the hands of their own sex.

I would urge that all female medical officers should be thoroughly well informed in the subject of sanitation and the laws of health, so as to be able to impart their knowledge in a pleasant popular way to the inmates of zenanas. Lady doctors from England might be encouraged, as well as the male medical students from India, to take the degree in State medicine required for sanitary medical officers in England.

A strong impetus is being given, and in this the "National Indian Association" takes an active part, to the school education of Indian girls, and it is certainly very desirable that hygiene should be included in the curriculum of study for girls as well as boys, especially in normal schools. Indian girls are remarkable for their zeal in learning whatever they are taught, and there is no reason why they should not, by-and-by, excel in teaching this subject, as some of their sisters excel in other intellectual efforts.

Why should not our sisters in India, when sufficiently educated, work as zealously and as effectually for their country as so many noble women in England (amongst whom stands prominently forward one who, 37 years ago, gave so powerful an impulse to the subject that brings men and women of various nationalities together to-day—the Hygæia of England, Florence Nightingale) have done for ours? A valuable sanitary primer, called the "Way to Health," has been published (in English) for the Education Department in the Punjab, and, on the representation of the "National Association for Supplying Medical Aid to the Women of India," the Indian Government have published a new edition, with translations of the work. A text book on domestic economy and sanitary science for the use of the senior classes of English and vernacular schools, which gained the reward of

* Prior to this, the idea of giving a medical education to Indian women had originated in Madras, and Surgeon-General Balfour had induced the Madras Government to throw open the Medical College to them. Mrs. Scharlieb, who has since distinguished herself at the University of London and in other ways, was one of the first students.

a thousand rupees offered by Government for the best treatise on the subject, has also been published.*

These are excellent publications, likely to do much good as text books in the higher schools; but there is room, I venture to think, for others (in the vernacular) suitable for elementary village schools and for use in the zenanas. In this connexion lady doctors for India would do well to examine the works published by the "National Health Society" and by the "Ladies' Sanitary Association." The natives of India are very fond of proverbs and stories. The *kuhāni-wāla* (story-teller) is always a welcome visitor in inns for travellers, and wherever people congregate; books, therefore, on hygiene, published on these lines, would, I believe, be very popular. I speak from personal experience.†

There is one important point in connexion with the laws of health which should not be overlooked, viz., the physical development of the body in athletic exercises. These should, always, be apportioned to the capacity of the individual. Sufficient care in this respect is not always taken, even in England; and, in consequence, it occasionally happens that the life of a lad who might otherwise have grown up into a fairly strong man is embittered, if not shortened, owing to the germs of disease—the result of too rough exercise—being laid before the body was fully formed. If this be so in a race remarkable for a powerful physique, how much more is it necessary that care should be taken in tropical regions where the youthful frame is, as a rule, so much inferior.

There are other subjects which, though not usually included under the head of hygiene, might well be taught to the youth (of both sexes) of India in connexion with preventive medicine. One of these is the extermination of poisonous snakes which, in conjunction with wild animals, annually destroy their thousands. Under the present system a reward is given for every dead serpent brought before the magistrate or civil authority of the district. But this plan does not, apparently, effect an appreciable reduction in the mortality. This is not surprising when it is remembered that a cobra-di-capello lays from 18 to 20 eggs at a time, so that, for every one captured a large number remain at liberty. I advocate, therefore, that the eggs of snakes—these are to be found in the neighbourhood of old walls and where the sun can reach them—should be secured. There is at present an obstacle to any extensive capture of snakes in the attitude of the people themselves, who offer religious objections to their destruction. Supposed to be associated with Deity, they are, in some parts, well cared for, and even worshipped. The low caste natives, therefore, who will alone undertake the work of extermination, receive but scant assistance from the

* A similar work has recently been prepared by Mrs. Brander, Senior Inspectress, for the use of teachers in the Madras Presidency.

† I once published a pamphlet of the kind, which remained for many years a text book in the village schools of the North-Western Provinces, serving as a pioneer for a more comprehensive publications. Destroyed during the mutiny of 1857, it was afterwards reprinted under the orders of Government.

community at large. But, as with progressive enlightenment, this superstition, with many others, will disappear, and the true character of these reptiles be clearly understood, we may reasonably hope that the individual slaughter, now conducted at such a disadvantage, will give place to a more comprehensive system of extirpation. The only other egg which is likely to be mistaken for a snake's is the lizard's, but there is really no difficulty in distinguishing between them. The snake's egg (oblate and white) has a soft but toughish leathery covering, whilst the lizard's has a hard shell. To distinguish between the eggs of poisonous and non-poisonous snakes is, however, impossible. But in a case of this kind there need be no compunction in destroying the innocent with the guilty.

The work of introducing preventive medicine amongst a people who believe that almost all disease is sent by angry gods, powerful demons, or evil spirits, must necessarily advance *pari passu* with religious as well as general enlightenment. Happily, sanitary measures, partial or complete, introduced into some of the larger towns, have met with no serious opposition from the natives; *e.g.*, they will drink and otherwise use water conveyed through pipes, though they will not use it for religious ceremonies; but the stronghold of custom and prejudice is in the *home*, the assault and carrying of which, by gentle methods peculiarly their own, can best be undertaken by women—the medically educated and noble-hearted daughters of the United Kingdom.

DISCUSSION.

Mr. Washington Lyon (London) agreed with Dr. Newsholme that if we expect to spread the important principles of hygiene amongst the masses, it must be done by teaching "the laws of health in schools." A knowledge of these should be made a leading subject in the examinations of children. He suggested that candidates for municipal honours might be questioned as to their knowledge of the principles of hygiene and kindred subjects, so as to fit them to sit on sanitary committees. He referred with praise to Miss Scott's paper on "Woman's Work in promoting the Cause of Hygiene," and pointed out the importance of women's aid in promoting the progress of hygiene. He thought the account given by Surgeon-General Francis of the progress in sanitary matters in India was most satisfactory. Although it was only a very short time since the first lady doctor (Miss Peachey) went to Bombay, she is now at the head of a large hospital there, teaching the principles of hygiene to the native women.

Popular Instruction in Preventive Dentistry.

BY

GEORGE CUNNINGHAM, M.A., Lecturer on Dental Surgery in the University of Cambridge.

The greatest difficulty with which dental practitioners have to contend is the want of knowledge and appreciation of the functional value of the teeth and of the care necessary for their preservation. Decay or caries of the teeth is not only the disease which dominates dental pathology, but it is also the most prevalent of all diseases affecting man. It is in a very special sense a disease of youth, though it is not confined to that period of life.

Recent statistics have proved that if we examine the mouths of say a hundred children between their second and fifth year, only one third of them will possess dentures free from caries. In examining the children during a later period of school life, we find that the proportion of defective permanent teeth and those already lost, varies from about 100 per cent. in the best schools to over 430 per cent. in the worst. When we remember that this amount of disease is found amongst permanent teeth which must have been only recently erupted, and recall the average condition of the teeth of the child on entering this period of school life, we can imagine the enormous amount of disease existing in the mouths of children during the prolonged period when the teeth are being changed.

An examination of 4,062 school children showed that of the permanent teeth 10,330 were either carious, already extracted, or in such a condition that extraction was the only remedy. Without regarding these temporary teeth which it was deemed inadvisable to treat on account of their approaching fall, 6,321 were marked as requiring treatment, most of them of course by extraction. In the total number of children at the age when they should have a complete denture with the exception of the third molars, it is found that only something like 10·5 per cent. of them had dentures free from caries, and some of these so-called perfect mouths presented either slight irregularity, remnants of the baby teeth, deposits of tartar, or required thorough cleansing. An examination of recruits for the army between the ages of 17 and 25 years, showed that each man on the average had lost 1·05, and would be the better for losing 2·31 (altogether 3·36 teeth already lost) and had 4·09 carious teeth capable of preservation by conservative treatment, thus giving a total of 7·45 defective teeth per man.

Caries affects all classes, for, although these statistics have been necessarily derived from institutions which represent the poorer classes of the community, the limited statistics yet at our command seem to indicate that matters are even worse amongst the well-to-do classes; but only a small percentage of the cases are too absolutely hopeless to be

beyond the limits of remedial conservative dental surgery. The curability of dental caries is very great, as Magitot has shown by statistics compiled in an open clinic that extraction was only necessary in one per cent. of the teeth attacked, calculated on a total comprising a large number of teeth. Were the treatment of the disease undertaken early enough, that is to say in its incipient or even in its second stage, extraction might only be necessary in something like 1 per 1,000. Caries therefore is almost a preventible disease, one might say even wholly preventible, if we regard treatment in the incipient stage as prophylaxis, for a large number of teeth are erupted in such a condition that a certain amount of caries is absolutely inevitable. The benefits of conservative dentistry have hitherto been confined almost entirely to the smaller and richer section of the community. As Sir John Tomes has pointed out, the problem as to how adequate medical and dental attendance can be rendered to the poor cannot be solved wholly on the same lines, for where one person requires medical, ten will require dental assistance, and where ten minutes may be spent in effecting medical treatment, several hours must be spent in effecting dental treatment.

"It cannot be doubted that mastication is necessary to health, and "that sound teeth, natural or artificial, will alone effect proper masti- "cation." Any scheme for the saving of the natural teeth, or the supply of artificial dentures for the replacement of the lost teeth for unmoneyed workers must necessarily be one of slow growth and development. But it would be very easy to organise a scheme of popular instruction in preventive dentistry which, besides achieving immediate and certain results which are far from being despicable, would effectually create a demand for some system of provident dental service. The need for popular instruction in hygiene and physiology in regard to health, while far from being adequately supplied, is still very largely recognised. Curiously enough the care and treatment of the teeth is, as a rule, conspicuous by its absence from those series of health lectures which have been already established.

Hygiene of the mouth should form an important, if not an essential part of any scheme of popular instruction which claims to be complete and thorough. That "prevention is better than cure" is as true of caries as it is of other diseases. The means of prevention are simple, the materials cheap, and thus within the reach of almost all, but the knowledge which should guide the application of prophylatic measures is possessed by only a relatively small portion of the community. The intelligent understanding of the construction of the human denture and of the causes which lead to its destruction must precede any general and thorough application of those measures recognised as calculated to promote its growth and development and to maintain its integrity. Popular lectures, as free from technicalities as possible, profusely illustrated by means of the optical lantern, are valuable means towards this end. Experience has shown that large audiences of even the poorest classes are capable of appreciating such lectures in an almost extraordinary way.

1 p. 2009.

[Mr. Cunningham showed a beautiful set of slides exhibiting—

1. A tooth and its component parts.
2. How, when, and where the teeth are built up.
3. The temporary teeth and the consequence of their premature removal or undue retention.
4. The permanent teeth, and the necessity of special attention to the first molar.
5. The complete denture, how it is spoilt or ruined by decay or caries, and indiscriminate extractions.
6. Causes of decay, its progress and its ultimate effects.
7. Tartar and its effects on the teeth and gums.
8. The effect of smoking on the teeth.
9. "Painless and perfect dentistry."]

In a discussion on the "Compulsory Attention to the Teeth of School Children" so ably advanced by Mr. Fisher before the British Dental Association in 1887, I advocated the publication of a work on "Physiology and Hygiene" as a kind of advanced Reader for school children. Such a Reader would, of course, include chapters on the formation and care of the teeth. This is a subject which might also be included in the scope of that most excellent adjunct to our educational institutions, namely, the National Home Reading Union.

Finally, I would direct attention to a remark made by Sir Morell Mackenzie, when presiding at a lecture to some 750 men and women in the Royal Victoria Hall, namely, "that a judicious exposition of the "treatment and the decay of the teeth, if acted on by the masses, would "probably do more to improve the national health than many more "ambitious designs."

Mr. Lithiby proposed, and Dr. Barry seconded, the following *Resolution*, which was carried by acclamation:—"That the cordial thanks "of this Section be conveyed to Professor Vilanova y Piera of Madrid, "Dr. Hewitt of Minnesota, U.S.A., and Dr. Guillaume of Berne, for "valuable works relating to matters connected with the Public Health, "which they had presented to the Congress."

INDEX.

A.

	Page
Abbott (J. S. W.), remarks in discussion on Assainissement des cimetières	117
—— —— remarks in discussion on Les falsifications des produits commerciaux et les mesures internationales pour leur répression	72
Act, provisions of the Vaccination, in Ontario	20
Acts, assimilation of sanitary and building	58
Address, Presidential	7
Administration, sanitary, for inspection, comparison of, in Germany, France, and England	129
Admissions, table showing number of, and ratios per 1,000 from primary syphilis and gonorrhœa in the Chatham district, from 1880 to 1890 inclusive	231
Air pollution, ancient and modern legislation against	67
Alexander (Hugh), report of the Council of the Association of Sanitary Inspectors of Great Britain	147
—— ——, resolution seconded by	154
—— ——, remarks in discussion on Sanitary registration of dwellings	66
Alkali Act, primary object of	69
—— —— of 1863, provisions of	67
—— works, number of, registered in Great Britain and Ireland	70
America, measures adopted in, as to the sale of poisons	78
American propositions with regard to the prevention of the spread of venereal diseases	219
Amos (Mrs. Sheldon), remarks in discussion on Sanitary registration of dwellings	66
Anderton (T.), remarks in discussion on the report of the Council of the Association of Sanitary Inspectors	153
Appareil crématoire, fonctionnement de l'	110
—— Fichet	109
—— Gorini	107
—— O. André et Piat pour l'introduction des corps	109
—— Toisoul et Fradet	108
Appareils crématoires	95
—— d'incinération	107
Architects, The statutory education and registration of. (W. Howard Seth-Smith)	119
Architecture, necessity for examinations in the science and art of	121
Army, On the sanitary condition (*re* venereal diseases) of the British home, previous to the Contagious Diseases Acts, during their operation and since their abolition. (Dr. J. B. Nevins)	221
Ashpits and privies in Dublin	26
Atkinson (Dr.), remarks in discussion on Should compulsory notification be made general?	201

B.

	Page
Ballard (Dr.), work in connexion with Local Government Board	30
Banks (Sir John), remarks in discussion on Results of ten years' public sanitary work in Dublin	29
Barry (Dr.), resolution seconded by	238
Basing, Lord, Presidential address	7
Below (Ernst), Suggestions for the constitution of an international convention on hygiene	36
Berdoe (Edward), remarks in discussion on Should compulsory notification be made general?	202
—— (Dr.), remarks in discussion on The duty of the State with respect to the spread of venereal disease	236

	Page
Besant (Mrs. Annie), remarks in discussion on The duty of the State with respect to the spread of venereal disease	236
Biddle (D.), Should compulsory notification be made general?	174
—— ——, remarks in reply	204
Biggs (Councillor, Leicester), remarks in discussion on Sanitary legislation in Ontario (Canada), &c.	21
Bishop (W. H.), Professor Garnett's paper read by	139
Block-system of dwellings, objections to	58
Board schools, registration of, as regards drainage and water-supply	63
Body, the physical development of in athletic sports	221
Boobbyer (Philip), Compulsory notification of infectious diseases	166
—— ——, remarks in discussion on Should compulsory notification be made general?	204
Brett (A.), remarks in discussion on Assainissement des cimetières	116
Brouardel, Du Mesnil, et Ogier (MM.), Assainissement des cimetières	113
Bruce (Dr. William), The need for popular instruction in hygiene and physiology	246
Buchan (W. P.), remarks in discussion on Assainissement des cimetières	116
Burial, provisions of a proposed Bill for safe and proper	91
—— and Cremation, Recent proposals relating to (Sir H. Thompson)	79
Burroughs (S. M.), on the housing of the poorer classes	60
Butler (Mrs. Josephine), remarks in discussion on The duty of the State with respect to the spread of venereal disease	235

C.

Caffort (Charles), Note sur la crémation à Paris en 1891	103
Cameron (Sir C.), remarks in reply	29
—— ——, Results of ten years' public sanitary work in Dublin	22
—— (J. Spottiswoode), An illustration of the advantage of the isolation of persons exposed to infection afforded by a limited outbreak of typhus fever in Leeds, during the spring of 1890	164
—— ——, remarks in discussion on Should compulsory notification be made general?	203
Cancer, call for special inquiry into the cause, &c. of	30
Carpenter (Miss), founder of the National Indian Association	249
Carteighe (Mr.), remarks in discussion on The extent to which the State should exercise control in the interest of public health over the sale of poisons	78
Cash (Dr.), work in connexion with Local Government Board	30
Cassidy (J. J.), Sanitary legislation in Ontario (Canada), for the prevention of epidemic, endemic, epizootic, and other contagious diseases	13
—— ——, remarks in reply	21
Cates (Arthur), remarks in discussion on The statutory education and registration of architects	124
Chapman (Dr.), remarks in discussion on The duty of the State with respect to the spread of venereal disease	236
—— ——, remarks in discussion on Should the State undertake the support of laboratories for the investigation of disease?	36
Cimetières, Assainissement des. (MM. Brouardel, Du Mesnil, et Ogier)	113
Codex alimentarius	73
Coe (Councillor), remarks in discussion on sanitary legislation in Ontario (Canada), &c.	21
Coffins, imperishable, material cause of much mischief in the disposal of the dead	88
Columbarium	110
Corbet (T.), remarks in discussion on Should compulsory notification be made general?	202

Page

Corbey (Professor), remarks in discussion on the report of the Council of the Association of Sanitary Inspectors - - 153

Corradi (Prof. Alfonso), Dans quelle mesure l'État peut-il intervenir pour empêcher la diffusion de la tuberculose? - 163

Covernton (Dr.), remarks in discussion on Should compulsory notification be made general? - 201

—— ——, remarks in discussion on sanitary legislation in Ontario (Canada), &c. - - - 21

Craik (Dr.), remarks in discussion on sanitary legislation in Ontario (Canada), &c. - - - 21

Cremation, advantages of, in all cases - - - - - 85

——, a direct and potent incentive to crime - - - 90

Crémation à Paris en 1891, Note sur la. (Charles Caffort) - 103

Cremation, desirability of, in cases of death from infectious disease - 84

——, process of - - - 83

Crémation, propagande—obstacles—réformes - - - 99

Cremation, Burial and, Recent proposals relating to. (Sir H. Thompson) - - - 79

Crémation en France, la, 1889-91. (Georges Salomon) - - 91

Crowding in the native Indian sick room often excessive - - 251

Cunningham (George), Popular instruction in preventive dentistry - - - 256

D.

Dead, moral cause of mischievous results in the disposal of - - 88

Death, remarks on the present system of certifying the cause of (Sir H. Thompson) - - 79

Death-Rates, contrast between two periods of non-notification and of notification, of four years each, table showing - - - 195

—— ——, diarrhœa, table showing 191

—— ——, diphtheria, table showing - - - - - 187

—— ——, "fever" (chiefly enteric), table showing - - 188

Page

Death-Rates, general (from all causes), table showing - - 181

—— ——, measles, table showing - 189

—— ——, non-notifiable zymotic, table showing - - - 184

—— ——, notifiable zymotic, table showing - - - - 183

—— ——, proportion of zymotic to total deaths in two periods of four years each, table showing - 193

—— ——, proportion of zymotic to total deaths in four quinquennia, table showing - 197

—— ——, scarlet fever, table showing - - - - 185

—— ——, small-pox, table showing 185

—— ——, total zymotic, table showing - - - 182

—— ——, uncertified deaths, table showing - - - - 195

—— ——, whooping cough, table showing - - - 190

—— ——, (mean), for each of four quinquennia, Part I., table showing - - - - 192

—— ——, (mean), for each of four quinquennia, Part II., table showing - - - 193

—— ——, (mean), for each of four quinquennia, Part III., table showing - - - - 194

—— ——, (mean), in yearly descending quinquennia, table showing - - - 196

Deaths, caused by syphilis - 225

——, number of, from all causes in England and Wales during the last three years - - 80

Dentistry, Popular instruction in preventive (George Cunningham) 256

Diarrhœa, call for special inquiry into the causes and etiology of - 31

Diphtheria, call for special inquiry into cause, &c. of - - 30

Discharge of noxious gases from manufacturing processes, The present state of British law controlling the (A. E. Fletcher) 66

Disease, comparative amount of, in the stations not under the C. D. Acts - - - 224

——, importance of disinfecting all bodies dying from (Sir H. Thompson) - - - 79

	Page
Disease, proposed steps for checking the spread of venereal -	210
——, Should the State undertake scientific investigations into the origin and causes of? (Hy. Tomkins) - - -	29
——, venereal, On the duty of the State with respect to the spread of (J. Holroyde) - -	227
Diseases Acts, the Contagious, in England - - - -	206
—— ——, the Contagious, in India	207
—— ——, the Contagious, influence of the repeal of, on the health of the civil population - -	225
Diseases, Compulsory notification of infectious (Philip Boobbyer) -	166
——, examinations to prevent spread of venereal, in Sweden -	208
——, laws to prevent spread of venereal, in Denmark -	209
——, laws to prevent spread of venereal, in Norway - -	210
——, Sanitary legislation in Ontario (Canada) for the prevention of epidemic, endemic, epizootic, and other contagious. (J. J. Cassidy)	13
——, American propositions with regard to the prevention of the spread of venereal - -	219
——, What steps should the State take to prevent the spread of venereal? (J. Birkbeck Nevins)	204
Domicile mortuaire, les mesures devant être prises au - -	93
Drainage and water supply, The sanitary registration of dwellings in regard to. (H. Rutherfo d)	61
Drainage in New York - -	43
Drysdale (Dr.), remarks in discussion on, Should compulsory notification be made general? -	202
—— ——, remarks in discussion on The duty of the State with respect to the spread of venereal disease - - -	235
"Dual" system of compulsory notification of infectious diseases	167
Dublin, condition of ashpits and privies in, before 1880 - -	26
——, death rate in 1879 -	23
——, measures adopted for improving the sanitary state of -	23
——, Results of 10 years' sanitary work in. (Sir Charles A. Cameron) - - -	22
Dublin, situation of, with respect to drainage - - - -	22
Du Mesnil, Brouardel, et Ogier (MM.), Assainissement des cimetières - - -	113
Dudfield (Dr.), (London) vote of thanks to President, proposed by	9
Duncan (Ebenezer), remarks in discussion on Assainissement des cimetières - - -	115
Du Pré (Dr.), work in connexion with Local Government Board -	30
Dwellings, The sanitary registration of, in regard to drainage and water supply. (H. Rutherfurd)	61

E.

	Page
Espagne, nouvelle loi sanitaire d' -	162
Ewing (Dr.), remarks in discussion on Should compulsory notification be made general? - -	203

F.

	Page
Falsifications des produits commerciaux et les mesures internationales pour leur répression. (P. F. van Hamel Roos) -	72
Fletcher (A. E.), The present state of British law controlling the discharge of noxious gases from manufacturing processes -	66
France, measures adopted in, in the interest of public health as to the sale of poisons - -	79
Francis (Surgeon-General C. R.), Hygiene for the zenanas of India	249

G.

	Page
Garnett (Professor), The education, position, and duties of plumbers	139
—— ——, remarks in discussion on plumbers' work - -	153
Gemmell (Dr.), remarks in discussion on Should compulsory notification be made general? -	203
Germany, measures adopted in, as to the sale of poisons - -	78
Glasgow Lock Hospital - -	213
Goff (Miss Annie), remarks in discussion on Should the State undertake the support of laboratories for the investigation of disease - - -	36

	Page
Gould (E. R. L.), American municipal hygiene in relation to the housing of labour	38
——, remarks in discussion on Sanitary registration of dwellings	66
Government Board, excellent hygienic work done by the Local	8
——, functions of medical department of Local	30
Graveyards, laxity of the Board of Health in 1840 in dealing with the subject of burial grounds	87
Grimshaw (T. W.), remarks in discussion on Results of 10 years' public sanitary work in Dublin	29

H.

Haden (Francis Seymour), The rational disposal of the dead; a plea for legislation	86
——, remarks in discussion on Assainissement des cimetières	117
Hamer (John), The State and the homes of the poor	57
Hart (Ernest), remarks in discussion on Assainissement des cimetières	118
——, resolution seconded by	119
Harvey (Brigade-Surgeon), remarks in discussion on The duty of the State with respect to the spread of venereal disease	235
Haughton (Dr.), remarks in discussion on Should the State undertake the support of Laboratories for the investigation of disease	36
Hay (Professor), remarks in discussion on the report of the council of the Association of Sanitary Inspectors	153
Health, The formation and organisation of Local Boards of. (Dr. Simon)	10
——, interest of public, over the sale of poisons, The extent to which the State should exercise control in the. (Dr. G. Danford Thomas)	74
—— Act (Ontario), passed in 1887, re school protection against infectious diseases	16
——, provisions of the Ontario, of 1882	13
——, Public, of 1885, Ontario, provisions of	16
Health Act, Public, of 1891 (Ontario)	18
——, department of the city of New York, composition of	40
——, syllabus of proposed course of study in the teaching of the laws of, in schools	241
Hewitt (Dr.), remarks in discussion on Should compulsory notification be made general?	200
Hill (Dr.), remarks in discussion on the report of the council of the Association of Sanitary Inspectors	153
Holroyde (J.), On the duty of the State with respect to the spread of venereal disease	227
Hotels and lodgings, legislative control of, as regards drainage and water supply	63
House drainage and water supply, insufficiency of legislation as to	61
Housing of the industrial classes, provision of the Board of Health of New York for	41
—— of the poorer classes. (Theodore Thomson)	52
—— of the poorer classes. (S. M. Burroughs)	60
—— of the poorer classes, difficulties in the way of	55, 60
—— of labour, American municipal hygiene in relation to the. (E. R. L. Gould)	38
—— of Labour, report required from the sanitary police in New York	47
Hygiene and physiology, The need for popular instruction in. (Dr. Wm. Bruce)	246
——, public organisations for promoting hygiene	244
——, of the mouth, importance of	257
——, Women's work in promoting the cause of. (Margaret Eleanor Scott)	242
——, women's work outside the home as nurses, teachers, lecturers on, &c.	243
——, for the zenanas of India. (Surgeon-General C. R. Francis)	249

I.

Ince (John), remarks in discussion on Assainissement des cimetières	117

Page

Incinération, l', egislation en ce qui concerne - - 103
Incinérations, formalités pour les - 104
——, statistique des - - 111
——, le tarif des, établi à Paris - 94, 106
Infants, feeding of - - 238
Infection from dead bodies, methods for the prevention of - - 83
Influenza, call for special inquiry into the cause, &c. of recent outbreak of - - - 31
Inspection, origin of the present system of sanitary - - 148
——, system of lay, in England - 130
Inspectors, qualification of sanitary 151
——, the first selections of - 148
International Hygienic Convention, Suggestions for the constitution of an. (Ernst Below) - - 36
Isolation of persons exposed to infection, Advantage of, afforded by a limited outbreak of typhus fever in Leeds, in 1890. (J. Spottiswoode Cameron) - - 164
Italy, measures adopted in, as to the sale of poisons - - 78

J.

Japan, measures adopted in, as to the sale of poisons - - 78
Judge (Mark H.), remarks in discussion on the Report of the Council of the Association of Sanitary Inspectors - - 153
—— ——, remarks in discussion on The statutory education and registration of architects - - 124
—— ——, remarks in discussion on the Sanitary registration of dwellings - - - 66

K.

Klein (Dr.), work in connexion with Local Government Board - 30
Kraus (Dr. B.), on the control of venereal disease - - - 220

L.

Laboratories, Should the State undertake the support of, for the investigation of disease? (A. E. Wright) - - - 32

Page

Law (Mr.), work in connexion with Local Government Board - 30
Lawrence (Rev. Mr.), work in connexion with the Church of England Funeral Reform Association 89
—— ——, remarks in discussion on Assainissement des Cimetières - 115
Lawson (Inspector-General), remarks in discussion on The duty of the State with respect to the spread of venereal disease - 235
Leeds, outbreak of Typhus Fever in, in 1890 - - - 164
Legislation, en ce qui concerne la crémation à Paris - - 103
Lithiby (Mr.), resolution proposed by - - - 258
—— ——, resolutions seconded by 118
Littlejohn (Dr.), remarks in discussion on The extent to which the State should exercise control over the sale of poisons - - 78
—— ——, resolution seconded by 79
—— ——, vote of thanks to President seconded by - - 9
Lodgings, legislative control of, as regards drainage and water-supply - - - - 63
Longstaff (Dr.), work in connexion with Local Government Board - 30
Lying-in chamber, insanitary condition of native Indian - - 250
Lyon (Washington), remarks in discussion on Hygiene for the zenanas of India - - 255
Lyons, report of Commission on preventive measures and regulations in contagious diseases - 218

M.

McGann (Brigade Surgeon), remarks in discussion on The extent to which the State should exercise control over the sale of poisons - 78
Monument crématoire - - 107
—— ——, les mesures devant être prises au - - - 93
Monuments crématoires - - 95
Mortality in New York City during the last 15 years, table giving the proportion of infant to total - 47
——, table showing, in an urban population in Ontario for 1889 - 20

Page

Mortality, from syphilis during the operation of the Contagious Diseases Acts - - - 226
Murphy (Shirley), remarks in discussion on Should compulsory notification be made general? - 200

N.

Nevins (J. Birkbeck), What steps should the State take to prevent the spread of venereal diseases? - 204
—— ——, On the sanitary condition (*re* venereal diseases) of the British Home Army previous to the Contagious Diseases Acts, during their operation, and since their abolition - - - - 221
—— ——, remarks in discussion on The duty of the State with respect to the spread of venereal disease - - - 237
Newark, N. J., supplement to the sanitary code adopted by the Board of Health of the city of, October 1890 - - - 48
Newsholme (Arthur), The teaching of the laws of health in schools - 237
New York, effects of sanitary legislation in - - - 43
—— ——, technical sanitary inspection of - - - 41
Notification, Should compulsory be made general? (D. Biddle) - 174
Nottingham, table showing result of compulsory notification of infectious diseases in, from 1882–1890 - - - 170

O.

Ogier, Brouardel, et Du Mesnil (MM.)., Assainissement des cimetières - - - 113
Ontario, provisions of Health Acts - 13, 15, 17, 18
——, Sanitary legislation in, for the prevention of epidemic, endemic, epizootic, and other contagious diseases. (J. J. Cassidy) 13
Organisation sanitaire en Espagne, de l'. (M. le Professeur Vilanova y Piera) - - - 154

P.

Page

Pankhurst (Dr.), remarks in discussion on The sanitary registration of dwellings - - 65
Parkes (Dr. Louis), remarks in discussion on The sanitary registration of dwellings - - 65
—— ——, remarks in discussion on Should compulsory notification be made general? - - 200
Parsons (Dr. H. Franklin), remarks in discussion on Assainissement des cimetières - - - 116
—— ——, work in connexion with the Local Government Board - 30
Physiology, The need for popular instruction on hygiene and. (Dr. Wm. Bruce) - - 246
Piera (M. le Professeur Vilanova y), De l'organisation sanitaire en Espagne - - - - 154
Plumber, individual responsibility resting on the ordinary journeymen - - - - 141
——, public interest involved in the position of - - - 141
Plumbers, The education, position, and duties of. (Prof. Garnett) - 139
——, the Worshipful Company of, preliminary examination - - 146
——, grand syllabus of instruction for, final course - - 145
——, grand syllabus of instruction for, intermediate course - - 145
——, grand syllabus of instruction for, preliminary course - - 144
Plumbing and drainage in New York - - - - 43
Pneumonia, investigation into the causes and origin of epidemic - 31
Poison, mortality from effects of, in 1889 - - - - 74
Poisons, schedules of - - 76
Popular instruction in prevention dentistry. (George Cunningham) 256
Poor, The State and the homes of the. (John Hamer) - - 57
Power (Mr.), work in connexion with Local Government Board - 30
Prince (Dr.), remarks in discussion on Sanitary legislation in Ontario (Canada), &c. - - - 21
Pringle (Brigade Surgeon R.), remarks in discussion on The duty of the State with respect to the spread of venereal disease - 235

Page

Privies and ashpits in Dublin - 26
Produits commerciaux, Les falsifications des, et les mesures internationales pour leur répression. (P. F. van Hamel Roos) - - 72
Prostitution, amount and course of primary venereal sores in the 14 stations put under regulated, (the Contagious Diseases Acts), from 1860 to 1889 - 223

R.

Rabbit plague, possibility of a remedy for, in the Australian Colonies - - - - 34
Reid (Dr. George), The education, training, and status of sanitary inspectors - - - 125
—— ——, resolution proposed by - 154
—— ——, resolution seconded by - 123
Report of the Council of the Association of Sanitary Inspectors of Great Britain to the Seventh International Congress of Hygiene and Demography - - 147
—— of the House of Lords Committee on the Contagious Diseases Act of 1866 - - - 213
Routh (D.), remarks in discussion on The duty of the State with respect to the spread of venereal disease - - - - 235
Rutherfurd (H.), The sanitary registration of dwellings in regard to drainage and water-supply - 61

S.

Salomon (Georges), la crémation en France, 1889–91 - - 91
—— ——, resolutions proposed by 118
Sanderson (Dr. Burdon), work in connexion with Local Government Board - - - 30
Sanitary and Building Acts, assimilation of - - - 58
—— Code, supplement to, adopted by the Board of Health of the City of Newark, N.J., October 1890 - - - 48
—— inspection of New York, technical - - - 41
—— inspectors, table relating to rural districts - - - 137, 138

Page

Sanitary Inspectors, table relating to urban districts - 133, 134, 135, 136
—— ——, tenure of office and protection in performance of duties of - - - 151
—— ——, The education, training, and status of. (Dr. George Reid) 125
—— law, Royal Commission formed in 1869 for England and Wales - - - 10
—— organization in France - 130
—— —— in Germany - - 129, 130
—— work in Dublin, Results of 10 years' public. (Sir Charles A. Cameron) - - - 22
—— legislation of New York, effects of - - - 43
Schools of England and Wales, number of scholars examined in various specific subjects in the elementary, during 1890 - - 240
Scotland, deaths in, during 1888, from zymotic diseases - - 80
Scott (Margaret Eleanor), Women's work in promoting the cause of hygiene - - - 242
Sergeant (Edward), remarks in discussion on Should compulsory notification be made general? - 200
Seth-Smith (W. Howard), The statutory education and registration of architects - - - 119
—— ——, resolution proposed by - 123
Simon (Dr.), The formation and organisation of local boards of health - - - - 10
"Single" system of compulsory notification of infectious diseases 167
Snakes, extermination of poisonous 254
Statutory education and registration of architects. (W. Howard Seth-Smith) - - - 119

T.

Tenement-house reform, permanent commission on, of New York - 43
Thomas (Dr. G. Danford), The extent to which the State should exercise control in the interest of public health over the sale of poisons - - - - 74
—— ——, resolution proposed by - 79

Page

Thompson (Sir Henry), On recent proposals relating to burial and cremation, and the importance of disinfecting all bodies dying from infectious disease; with remarks on the present system of certifying the cause of death - 79
—— ——, remarks in discussion on Assainissement des cimetières - - - 117
—— ——, resolution moved by - 118
Thomson (Theodore), The housing of the poorer classes - - 52
Tomkins (Hy.), Should the State undertake scientific investigations into the origin and cause of disease? - - - 29
—— ——, remarks in discussion on Should the State undertake the support of laboratories for the investigation of disease? - 36
Towns, nine non-notification, table of - - - - - 172
——, ten notification, table of - 171
——, —— ——, table of - - 172
Tuberculose, Dans quelle mesure l'État peut-il intervenir pour empêcher la diffusion de la. (Alfonso Corradi) - - 163
Tuberculosis, call for special inquiry into the etiology and transmission of - - - 31
Typhus fever, outbreak of, in Leeds, &c. (Dr. J. S. Cameron) 164

U.

Urnes.——Columbarium - - 105

V.

Van Hamel Roos (P. F.), Les falsifications des produits commerciaux et les mesures internationales pour leur répression - 72
Venereal disease, effects of State regulation of, and of the absence of such regulations, at Chatham - 233
Ventilation, imperfect in all Hindu dwellings - - - 250

Page

Vienna, resolution passed by the International Medical Congress in, regarding State control of the spread of venereal disease - 218
Vivant (Dr.), remarks in discussion on Should compulsory notification be made general? - - 202
Vivisection, the question of - - 35

W.

Water-supply, The sanitary registration of dwellings in regard to drainage and. (H. Rutherfurd) - 61
Wells (Sir Spencer), remarks in discussion on Assainissement des cimetières - - - 115
Whitaker (Dr.), remarks in discussion on Results of ten years' public sanitary work in Dublin - 29
—— ——, remarks in discussion on Sanitary legislation in Ontario (Canada), &c. - - - 21
Willoughby (Dr.), remarks in discussion on Should compulsory notification be made general? - 201
—— ——, remarks in discussion on Assainissement des cimetières 117
—— ——, remarks in discussion on The formation and organisation of local boards of health - 13
Wilson (Henry J.), remarks in discussion on The duty of the State with respect to the spread of venereal disease - - 236
Women's work in promoting the cause of hygiene. (Margaret Eleanor Scott) - - - 242
Woolridge (Dr.), work in connexion with Local Government Board - - - - 30
Wright (A. E.), Should the State undertake the support of laboratories for the investigation of disease? - - - 32

Z.

Zenanas of India, hygiene for the. (Surgeon-General C. R. Francis) 249
Zymotic diseases, mortality from, in reference to cremation - - 80

LONDON: Printed by EYRE and SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty

TRANSACTIONS

OF THE

Seventh International Congress of Hygiene and Demography.

LONDON, AUGUST 10TH–17TH, 1891.

Patron:—HER MAJESTY THE QUEEN.

President:—H.R.H. THE PRINCE OF WALES, K.G.

VOLUME X.

Division II.

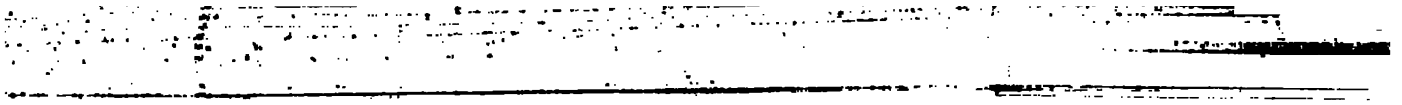
DEMOGRAPHY.

EDITED BY C. E. SHELLY, M.A., M.D.

Assisted by the HONORARY SECRETARIES of the DIVISION.

LONDON:
PRINTED BY EYRE AND SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.

1892.



OFFICERS OF THE DIVISION.

PRESIDENT.

FRANCIS GALTON, F.R.S.

HONORARY PRESIDENTS.

Dr. JACQUES BERTILLON, France.
Dr. R. BÖCKH, Germany.
Professor L. BODIO, Italy.
Dr. A. CHERVIN, France.
Dr. CARL I. VON INAMA-STERNEGG, Austria-Hungary.
Professor JULES JAHNSON, Russia.
Dr. JOSEF KÖRÖSI, Austria-Hungary.
Dr. GEORG VON MAYR (Bavaria), Germany.
Dr. W. E. MILLIET, Switzerland.
Dr. ENRICO RASERI, Italy.

VICE-PRESIDENTS.

Right Hon. LEONARD H. COURTNEY, M.P.
ROBERT GIFFEN, C.B., LL.D., late President, Royal Statistical Society, Assistant Secretary, Board of Trade.
Right Hon. SIR JOHN LUBBOCK, Bart., M.P., F.R.S.
F. J. MOUAT, M.D., LL.D., President, Royal Statistical Society.
B. NEWBATT, President, Institute of Actuaries.
WM. OGLE, M.D., Superintendent of Statistics, General Register Office.
Right Hon. SIR LYON PLAYFAIR, M.P., K.C.B., F.R.S.
SIR RAWSON W. RAWSON, K.C.M.G., C.B., Pres. International Statistical Inst.
E. B. TYLOR, LL.D., F.R.S., President, Anthropological Institute.

COUNCIL.

THOMAS BURT, M.P.
Dr. ENGEL BEY.
Dr. BÉLA FÖLDES.
Dr. GUILLAUME.
ROWLAND HAMILTON, F.S.S.
FREDERICK HENDRIKS, F.I.A., F.S.S.
SIR JOHN KIRK, G.C.M.G., K.C.B., M.D., F.R.S.
G. B. LONGSTAFF, F.R.C.P., F.C.S.
JOHN BIDDULPH MARTIN, For. Sec. Royal Statistical Society.
Dr. HENRI NAPIAS.
E. G. RAVENSTEIN, F.R.G.S.
M. EUGÈNE TISSERAND.
DAVID F. SCHLOSS.
Professor RICHMOND MAYO SMITH.

HONORARY SECRETARIES.

STEPHEN N. FOX.
ARTHUR NEWSHOLME, M.D., D.P.H.
ADOLPHE SMITH.

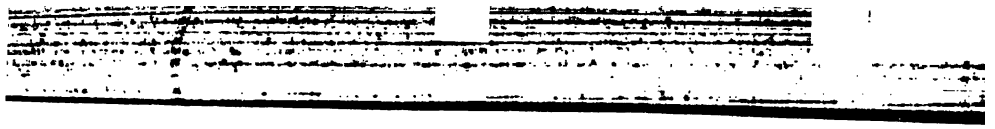


TABLE OF CONTENTS.

	Page.
Presidential Address	7
Mortality in relation to Occupation	12
De la Morbidité et de la Mortalité par Professions	23
De la Mortalité des Mineurs, des Armurieurs, et des Passimentiers à St. Etienne, 1880-89	57
Discussion	62
Thrift in Great Britain	67
The Board and Lodging of London Work-Girls	76
Bericht über die Sozialstatistische Ausbeute der Arbeiterversicherung	84
Discussion	106
The Protection of Workmen in Factories, and its promotion by Museums of Industrial Hygiene	110
Réduction de la Mortalité des grandes Cités: application à Barcelone	113
The Economic Advantages of Industrial Hygiene	127
Les Migrations en France et en Europe	131
Discussion	153
Tropical Highlands: their Suitability for European Settlement	155
The Suitability of Tropical Highlands for European Settlement	165
To what extent are Tropical Altitudes adapted for Settlement by Europeans?	170
On the Suitability of Mountainous Regions and of Islands in the Tropics for European Settlement	178
The Growth and Development of Anglo-Indian Children	184
Discussion	185
On the Influence of Clays and Limestones on Medical Geography: Illustrated by the Geographical Distribution of Cancer amongst Females in England and Wales	186
The Influence of Geology upon Health, and upon the distribution of Disease	195
Bericht über eine Lepra-Enquête in Egypten	196
Indian Factory Legislation	219
Factory Labour in the Indian Spinning and Weaving Mills	232
Discussion	242
An Analysis of Mr. Holt Hallett's paper on Factory Legislation in India	245
Le Travail à Domicile en Russie	249
Du Travail dans les Fabriques au point de vue Sanitaire	255
Remarques sur les Périodes d'Observation dans les Recherches démographiques	258
Einfluss des Alters der Eltern auf die Vitälitat ihrer Kinder	262
Discussion	292
Personal Identity determined by Scars and other Body Marks	294
Finger-prints and their Registration as a means of Personal Identification	301
Résultats Statistiques de l'Anthropométrie appliquée à l'Identification des Personnes	303
Discussion	307
Results of Anthropometry at Cambridge	308

	Page.
The Physical condition of Children seen in Schools, and the local distribution of Conditions of Defective Development	315
An Examination into the Condition of the Teeth of School-children: Preliminary Report of the Committee appointed by The British Dental Association	323
The Physical Condition of Pauper children boarded out under the Local Government Orders, 1870, and Amended 1889	329
Discussion	335
Special Resolutions	336

INDEX.

DIVISION II.

DEMOGRAPHY.

Tuesday, 11th August 1891.

The Chair was occupied by
The President, FRANCIS GALTON, Esq., F.R.S.

Presidential Address.

BY

FRANCIS GALTON, Esq., F.R.S.

In the address which it is my honourable duty to deliver at the opening of this Congress, it would be presumptuous to obtrude opinions on any one of the larger parts of the subjects that will engage its attention. I am addressing experts who have practically dealt with the numbers and occupations, with the marriages, births, and deaths of millions of their countrymen; who have investigated on the largest scale the effects of past legislation, and collected new data in which accurate information was from time to time of pressing national importance. I have not had the experience necessary to justify my addressing you on these matters in their more familiar aspects. Instead of doing so, I will ask your attention for a few minutes to certain topics of demographic inquiry which enter into the great problem of the future betterment of the human race.

They are confessedly, at the present time, hardly advanced beyond the stage of academic interest, but thought and action move swiftly now-a-days, and it is by no means impossible that a generation which has witnessed the exclusion of the Chinese race from the customary privileges of settlers in two continents, and the deportation of a Hebrew population in a third, may live to see other acts of any analogous kind performed under sudden socialistic pressure. The questions about to be considered may unexpectedly acquire importance as falling within the sphere of practical politics, and if so, many demographic data that require forethought and time to collect, and a dispassionate and leisurely judgment to discuss, will be hurriedly and sorely needed.

The topics to which I will allude are the relative fertility of different classes and races, and their tendency to supplant one another under various circumstances.

The whole question of fertility under the various conditions of civilised life requires more detailed research than it has yet received. We require further investigations into the truth of the hypothesis of Malthus, that there is really no limit to over-population beside that which is afforded by misery or prudential restraint. Is it true that misery in any justifiable sense of that word, provides the only check which acts automatically, or are other causes in existence, active, though as yet obscure, that assist in restraining the overgrowth of population? It is certain that the productiveness of different marriages differs greatly in consequence of unexplained conditions. The variation in fertility of different kinds of animals that have been captured when wild and kept in menageries is, as Darwin long since pointed out, most notable and apparently capricious. Most of those which thrive in confinement, and enjoy apparently excellent health, are nevertheless absolutely infertile; others, often of closely allied species, may have their productivity increased. One of the many evidences of our great ignorance of the laws that govern fertility, is seen in the behaviour of bees, who have somehow discovered that by merely modifying the diet and the size of the nursery of any female grub, they can at will cause it to develop, either into a naturally sterile worker, or into the potential mother of a huge hive.

Demographers have, undoubtedly, collected and collated a vast amount of information bearing on the fertility of different nations, but they have mainly attacked the problem in the gross and not in detail, so that we possess little more than mean values that are applicable to general populations, and are very valuable in their way, but we remain ignorant of much else, that a moderate amount of judiciously directed research might, perhaps, be able to tell.

As an example of what could be sought with advantage, let us suppose that we take a number sufficient for statistical purposes, of persons occupying different strata or classes, those who are the least efficient in physical, intellectual, and moral grounds, forming our lowest class, and those who are the most efficient forming our highest class. The question to be solved relates to the hereditary permanence of the several classes. What proportion of each class is descended from parents who belong to the same class, and what proportion is descended from parents who belong to each of the other classes? Do those persons who have honourably succeeded in life, and who are presumably, on the whole, the most valuable portion of our human stock, contribute on the aggregate their fair share of posterity to the next generation? If not, do they contribute more or less than their fair share, and in what degree? In other words, is the evolution of man in each particular country, favourably or injuriously affected by its special form of civilisation?

Enough is already known to satisfy us that the productiveness of both the extreme classes, the best and the worst, falls short of the average of the nation as a whole. Therefore, the most prolific class necessarily lies between the two extremes, but at what intermediate point does it lie? Taken altogether, on any reasonable principle, are the natural gifts of the most productive class, bodily, intellectual, and

moral, above or below the line of national mediocrity. If above that line, then the existing conditions are favourable to the improvement of the race. If they are below that line, they must work towards its degradation.

These very brief remarks can only serve to shadow out the problem; it would require much more time than is at my disposal as well as much discussion, before it could be phrased in a way free from ambiquity, so its solution would clearly instruct us whether the conditions of life at any period in any given race were tending to raise or to depress its natural qualities.

The amount of the effect produced in particular instances by natural selection acting on the human race during a few successive generations, well deserve strict demographic investigation. In our present ignorance we may easily fall into great error by over-estimating its influence, for natural selection may act simultaneously under at least three different conditions that are as yet imperfectly distinguished. So far as the selected individuals are ordinary varieties of the race, in the sense that their qualities are merely blends of those of their ancestors, the average racial qualities will tend to reassert themselves in their descendants, and after the period of selection has come to an end the race will soon regress to its ancient character, like the once familiar pedigree wheat. Or again, the race may be of an essentially stable type, showing that a strong tendency exists in the descendants of those who had widely departed from the central and securest form to regress towards it.

In this case the result will be the same as before, in that a long continuance of natural selection will not permanently injure the race. Or, on the other hand, the national type may be unstable, tending to split into sub-types, or else to form what the breeders call "sports," each of which is the possible origin of a variety that may become firmly established in the future. Here the preservation of each valuable and fertile sub-type, through the effects of selection, is a new and firm step towards the improvement of the race as a whole. Think of the gain that has accrued to the musical world through the breed of one gifted individual, the famous Sebastian Bach.

Whatever other countries may or may not have lost, ours has certainly gained on more than one occasion by the infusion of the breed of selected sub-races, especially of that of the Protestant refugees from religious persecution on the continent.

It seems reasonable to look upon the Huguenots as men who, on the whole, had inborn qualities of a distinctive kind from the majority of their countrymen, and who may, therefore, be spoken of as a sub-type, that is to say, capable, when isolated, of continuing their race without its showing any strong tendency to revert to the form of the earlier type from which it was a well defined departure. It proved, also, that the cross breed between them and our ancestors was a singularly successful mixture. Consequently England has been largely indebted to the natural refinement and to the solid worth of the Huguenot breed, as

well as to the culture and technical knowledge that the Huguenots brought with them.

The frequency in history with which one race has supplanted another over wide geographical areas is one of the most striking in the evolution of mankind. The denizens of the world at the present day form a very different human stock to that which inhabited it a dozen generations ago, and to all appearance a no less difference will be found in our successors a dozen of generations hence. Partly it may be that new human varieties have come into permanent or only into temporary existence, like that most remarkable mixed race of the Normans many centuries ago, in whom, to use well known words of Mr. Freeman, the indomitable vigour of the Scandinavians, joined to the buoyant vivacity of the Gaul, produced the conquering and ruling race of Europe. But principally the change of which I spoke is due to great alterations in the proportions of those who belong to the old and well established types. The Negro now born in the United States has much the same natural faculties as his distant cousin who is born in Africa. The effect of his transplantation being ineffective in changing his nature, but very effective in increasing his numbers, in enlarging the range of his distribution, and in destroying native American races. There are now some 8,000,000 of Negroes in lands where not one of them existed 12 generations ago, and probably not one representative of the race which he displaced remains there; on the other hand, there has been no corresponding diminution of numbers in the parent home of the Negro. Precisely the same may be said of the European races who have during the same period swarmed over the temperate regions of the globe, forming the nuclei of many future nations.

It is impossible, even in the vaguest way, in the short time at my disposal, to give a just idea of the magnitude and variety of changes produced in the human stock by the political events of the last few generations, and it would be difficult to do so in any case in a manner that would not be likely to wound the patriotic susceptibilities of many or all of us. The natural temperaments and moral ideals of different races are various, and praise or blame cannot be applied at the discretion of one person without exciting remonstrance from others who take different views with perhaps equal justice. The birds and beasts assembled in conclave may try to pass a unanimous resolution with a large majority in favour of the natural duty of the mother to nurture and protect her offspring, but the cuckoo would musically protest. The Irish celt may desire the extension of his race and the increase of its influence in the representative governments of England and America, but the wishes of his Anglo-Saxon or Teuton fellow-subjects may lie in the opposite direction, and so on indefinitely. My object now is merely to urge inquiries into the historical fact whether legislation, which has led to the substitution on a large scale of one race for another, has not often been the outcome of conflicting views into which the question of race hardly entered at all, and which were so nearly balanced that if the question of race had been properly introduced into the discussion the result might not have been different. The possibility of such being the

case cannot be doubted, and by itself affords strong reason for justly appraising the influence of race, and of hereafter including it at neither more nor less than its real value, among the considerations by which political action will be determined.

The importance to be attached to race is a question that deserves a far larger measure of exact investigation than it receives. We are exceedingly ignorant of the respective ranges of the natural and acquired faculties in different races, and there is far too great a tendency among writers to dogmatise wildly about them, some grossly magnifying, others as greatly mimising their several provinces. It seems within the power of demography to answer this question unambiguously, difficult as it is.

The recent attempts by many European nations to utilise Africa for their own purposes gives immediate and practical interest to inquiries that bear on the transplantation of races. They compel us to face the question as to what races should be politically aided to become hereafter the chief occupiers of that continent. The varieties of Negroes, Bantus, Arab half-breeds, and others who now inhabit Africa are very numerous, and they differ much from one another in their natural qualities. Some of them must be more suitable than others to thrive under that form of moderate civilisation which Europeans are likely to introduce into Africa by their enforcing justice and order, exciting a desire among the natives for material advantages for what might not be called luxuries, and making steady industry almost a condition of living at all. Such races would spread and displace the others by degrees. Or it may prove that the Negroes, one and all, will fail as much completely under the new conditions as they have failed under the old ones to submit to the needs of a superior civilisation to their own, in which case their races, numerous and prolific as they are, will in course of time be supplanted and replaced by their betters.

It seems scarcely possible as yet to assure ourselves as to the impossibility of any variety of white men to work, to thrive, and to continue their race in the broad regions of the tropics. We could not do so without better knowledge than we now possess of the different capacities of individuals to withstand their malarious and climatic influences. Much more care is taken to select appropriate varieties of plants and animals for plantation in foreign settlements, than to select appropriate types of men. Discrimination and foresight are shown in the one case, an indifference born of ignorance is shown in the other. One aspect of this question will be discussed in the course of our proceedings, and I await the result with keen interest and have no wish to attempt to forestall it. What I now desire to point out is the importance of a more exact examination and careful record than is now made of the physical qualities and hereditary antecedents of candidates for employment in tropical countries. We desire to judge how far medical forecast is justified by the result, and more especially to find out the conditions in youth that are prevalent among those whose health subsequently endures the change of climatic influence satisfactorily, and

conversely as regards those who fail. It is scarcely possible to properly conduct such an investigation respectively.

In conclusion I wish to emphasize the fact that the improvement of the natural gifts of future generations of the human race is largely, though indirectly, under our control. We may not be able to originate, but we can guide. The processes of evolution are in constant and spontaneous activity, some pushing towards the bad, some towards the good. Our part is to watch for opportunities to intervene by checking the former and giving free play to the latter. I wish to distinguish clearly between our power in this fundamental respect and that which we also possess of ameliorating education and hygiene. It is earnestly to be hoped that demographers will increasingly direct their inquiries into historical facts, with the view of estimating the possible effects of reasonable political action in the future, in gradually raising the present miserably low standard of the human race to one in which the Utopias in the dreamland of philanthropists may become practical possibilities.

Mortality in relation to Occupation.

BY

WILLIAM OGLE, M.D., F.R.C.P.

Of all the various influences that tend to produce differences of mortality in the different parts of a given country, there is none so potent as the character of the prevailing occupations.

Favourable or unfavourable climatic and geographical conditions, activity or inactivity on the part of the sanitary authorities to provide wholesome water, to remove filth, and to prevent overcrowding, contribute doubtlessly in no small measure to reduce the death-rate in one town or to raise it in another; but all differences, so produced, are insignificant, when compared with the differences shown by the death-rates in different industries.

There are some occupations of so deadly a character, that life insurance companies will have nothing to say to them, refusing to insure the life of a man engaged in them on any terms whatsoever, while, on the other hand, there are professions, or at any rate, there is one profession, in which the chances of longevity are so high, that an insurance company which is lucky enough to number a considerable proportion of those so engaged among its clients, advertises the fact to show the general public upon what a safe basis its business is founded.

The comparative mortality of the persons employed in different industrial occupations is, then, a subject than which none more appropriate could be found for discussion in a Congress of Hygiene and Demography. Nor could any more appropriate place be found for its discussion than the country in which we are now assembled. For in

the first place there is no country in which the number of occupations is greater, probably none in which it is so great, as England with its numerous and varied manufactures.

It fell to my lot some years ago to have to construct for official purposes an alphabetical index of all the various occupations in which persons are engaged in England and Wales. I issued circulars, asking for information, to manufacturers of all kinds; and searched through the trade directories of the chief industrial towns, and by these means, together with the old census documents, I collected no less than 12,000 different names of occupations; and, even when all allowance is made for some of these names being duplicates for one and the same occupation, the remaining number will still be enormous.

Secondly, not only are the occupations thus numerous, but they are grouped in the census returns of the United Kingdom under a much larger number of distinct headings than is the case in the census of any other country; and thirdly, the persons in any given occupational group are subdivided in our census returns, not merely by sex, but also by their ages, to an extent not to be found elsewhere, unless indeed it be in Switzerland.

The sub-division by ages is of the very highest importance. Even for other purposes a tabulation of the population by their occupations can be of but very inferior value, if no account be given of the age distribution of the persons in each group; but for calculations of mortality such particulars are absolutely necessary. For the differences in the age-distribution of the persons employed in different industries and professions are so great, that the comparison of the crude death-rates, that is of the death-rates calculated on the aggregate persons employed without correction for differences of age distribution, would often lead to most serious errors.

The only method of making death-rates that can be safely compared with each other is the laborious plan of calculating the death-rates for each occupation at each separate successive age-period, and then applying these successive death-rates to a population with precisely the same age-distribution in each industry.

This method, indeed, is necessary, not only when the mortality of an occupation is being compared with that of any other, but generally in all comparisons of mortality, as for instance, in comparison between the mortalities of different countries, or between the mortalities of the two sexes. It is, however, a method which, owing to its laboriousness, is rarely used, with the necessary consequence that many very erroneous comparisons are made.

The figures which I shall now give as to the mortality in different industries and professions were derived from a comparison between the census returns for 1881 and the death registers for the three years 1880–1–2.

They relate exclusively to males; for the returns made by the other sex, both of their occupations and their ages, are not sufficiently accurate to give a basis for calculation.

The figures, moreover, relate only to males between 25 and 65 years of age, for several reasons which it is unnecessary now to discuss, but mainly because these 40 years of life are those in which, speaking generally, the influence of occupation is most marked.

The figures have been derived from two death-rates in each occupational group, one the death-rate of men between 25 and 45, the other the death-rate of men between 45 and 65, and these rates have been in each case applied to a male population in which those under and those over 45 bear a certain fixed proportion to each other.

Of the death-rates thus obtained the lowest was that of men in the clerical profession, and for the sake of easy comparison I have taken this lowest death-rate as my standard. I represent it by 100, and the death-rate of each other profession or industry is represented by a figure duly proportionate to this standard.

TABLE A.

COMPARATIVE MORTALITY of MEN, 25 to 65 Years of Age, in different Occupations, 1881–2–3.

Occupation.	Comparative Mortality.	Occupation.	Comparative Mortality.
Clergymen, priests, ministers	100	Builders, masons, bricklayers	174
Lawyers	152	Carpenters, joiners	148
Medical men	202	Cabinet-makers, upholsterers	173
		Plumbers, painters, glaziers	216
Gardeners	108		
Farmers	114	Blacksmiths	175
Agricultural labourers	126	Engine, machine, boiler makers	155
Fishermen	143		
		Silk manufacture	152
Commercial clerks	179	Wool, worsted, manufacture	186
Commercial travellers	171	Cotton manufacture	196
Innkeepers, liquor dealers	274		
Inn, hotel service	397	Cutlers, scissor makers	229
Brewers	245	Gunsmiths	186
		File makers	300
Butchers	211		
Bakers	172	Paper makers	129
Corn millers	172	Glass workers	214
		Earthenware makers	314
Grocers	139		
Drapers	159	Coal miners	160
Shopkeepers generally	158	Cornish miners	331
		Stone, slate, quarriers	202
Tailors	189		
Shoemakers	166	Cab, omnibus service	267
Hatters	192	Railway, road, labourers	185
Printers	193	Costermongers, hawkers, street sellers	338
Bookbinders	210		

Time will not allow me to enter into any detailed examination of these figures; but you will notice how enormous are the differences of mortality in the different industries included in the list, the mortality

figure being three or more times as high in some cases as it is in others. The mortality of clergymen, for instance, being represented by 100, that of men engaged in the earthenware manufacture is represented by 314, and that of inn and hotel servants by no lower a number than 397.

Now to what causes are these striking contrasts due? Why is one occupation so much more unhealthy than another?

The causes of high mortality may, I think, be conveniently classed under seven general headings.

(1.) Firstly, there is working in a cramped or constrained attitude, and notably in such an attitude as cramps the chest and interferes with the action of the heart and lungs.

This cause to a certain extent may be said to affect all persons who are habitually engaged in sedentary occupations. But there are some trades which are more specially affected by it; and Dr. Greenhow instances the "silk weavers of Macclesfield, the lace makers of Buck-"inghamshire, and the glovers of Yeovil; in the first of which three "classes the mischief is caused by pressure of the chest against the "breast-beam of the loom, preventing the due expansion of the lungs; "while in the other two classes the same evil is produced by contraction "of the chest, induced by habitual stooping over their work." Possibly some share in producing the somewhat high mortality of shoemakers, as shown in the table, may be ascribed to this same cause, namely, the bent and stooping attitude in which they work and the pressure of the last against the pit of the stomach.

(2.) The second cause is exposure to the action of special poisonous or irritating substances, such as phosphorus, mercury, lead, infected hair or wool, soot, etc.

As examples of this, I may enumerate the jaw disease that attacks the dippers of lucifer matches; the mercurial tremor and ulceration of the fauces that attack water gilders, hatters, furriers, and others that make use of quicksilver; the arsenical poisoning of paper-hangers, pigment makers, and those who manufacture artificial flowers; the cancer of chimney sweeps; the anthrax of woolsorters; and the so-called "brass-founders ague" of workers in copper or zinc; and, lastly, the various diseases that assail those who work in lead.

It is this last poison that, in this country at any rate, is of the most interest, because of the comparatively large number of industries in which the workman is brought into contact with the metal. It is this which, in combination with a more than average liability to accident, causes the high mortality of painters, plumbers, and glaziers, as shown in the table; and which, in combination with the inhalation of metallic dust, raises the death-rate of file-makers, who use a cushion of lead on which to strike the files, to so enormous a figure. This same poison contributes to the mortality of earthenware-makers, of gasfitters, of printers, and other workers that need not be here enumerated. The chief sufferers, however, appear to be the painters and glaziers and the file-makers. For, judging from such scanty data as could be extracted from four years' (1879–82) death-registers, I found that the annual

mortality from lead poisoning among males over 15 years of age, was as follows:—

File-makers - -	466	per million	living.
Painters, plumbers, glaziers -	224	„	„
Earthenware-makers -	152	„	„
Gasfitters - - -	62	„	„
Printers - - -	27	„	„
All other males - -	4	„	„

I need hardly say that the deaths directly ascribed to lead poisoning, on which the above rates are based, by no means fully represent the amount of mortality caused by that poison. Lead affects injuriously all the organs of the body, and notably the kidneys, as well as the nervous and the muscular tissues.

Thus, of all the industries into whose mortality I have inquired, the two in which the mortality from urinary diseases was the highest were the file-makers and the painters and plumbers, the mortality under this heading being three times as high as the average among the former, and more than twice as high among the latter.

(3.) The third cause of high mortality is excessive work, mental or physical. As to excessive brain-work I need say nothing. We all know how such work, especially if of a harassing character, leads to disease of the nervous system, brain softening, insanity, and suicide, this last especially being much more frequent, speaking generally, among the educated classes who use their brains than among the comparatively uneducated labourers.

As regards excessive bodily labour, we must make a distinction, according as the labour is merely severe because of its long continuance, or is such as subjects the worker to violent muscular efforts and consequent strains. The former, or merely long-continued hard work, does not seem nearly so injurious as is often supposed. At any rate, neither agricultural labourers nor miners seem to suffer from it; for in each the mortality is very low, the agricultural labourers being indeed one of the groups with the lowest mortality figures.

But as regards men subjected to sudden strains the case is different. Porters and dock labourers, for instance, are notoriously liable to hernia, and it has recently been stated that the latter rarely escape that affection. I am unable to give any precise statistics as to this, nor do I know whether the statement be true. There is, however, one industry in the table, in which I cannot but think that the effects of violent and sudden exertion are visible. I refer to fishermen. Fishermen are with miners and quarrymen more liable to fatal accident than any other set of men; they live, moreover, a life of exposure to all kinds of rough weather. Nevertheless, their death-rate is extremely low, the mortality figure as given in the table being only 143, and one of the lowest. But there is one group of diseases to which I was surprised to find that, so far as could be inferred from the records of those years, fishermen, otherwise so healthy, appeared to be liable in a far more than average degree, namely, diseases of the heart and organs of circulation.

Possibly the cold and wet to which the fisherman is exposed, and the consequent rheumatic affections, may have some share in this, and perhaps also the frequent and prolonged periods of anxiety that beset his life of peril, but I cannot but suspect that the main cause is to be found in the sudden muscular strains and violent efforts to which his occupation subjects him.

(4.) Fourthly, I come to working in confined space and in foul and over-heated air. This is probably, in the aggregate, one of the most destructive agencies in operation, because of the very large number of trades that are exposed to it.

The difference between an outdoor life in fresh country air and an indoor life in a town is readily shown by comparing the mortality of farmers, agricultural labourers, gardeners, and fishermen, with that of shopkeepers, or, going a step further in the scale of vitiated atmosphere, with the mortality of tailors, printers, bookbinders, and hatters, all of whom habitually work in over-heated and under-ventilated rooms.

The damage done by working under such conditions is not confined to one set of organs, but nevertheless specially affects the lungs, and, therefore, in the following short table I have confined myself to phthisis and diseases of the organs of respiration. I have taken fishermen, who suffer least from these diseases, as my standard, and have represented their mortality as 100.

TABLE B.

COMPARATIVE MORTALITY from PHTHISIS and LUNG DISEASES of MEN (45–65 Years) working in pure and in vitiated Air.

Air.	Occupation.	Phthisis.	Diseases of Respiratory Organs.	Phthisis and Diseases of the Respiratory Organs.
Pure	Fishermen	55	45	100
	Farmers	52	50	102
	Gardeners	61	56	117
	Agricultural Labourers	62	79	141
Confined air	Grocers	84	59	143
	Drapers	152	65	217
Highly vitiated air	Tailors	144	94	238
	Printers	233	84	317

(5.) The fifth cause of the vast differences of mortality is one which differs from the rest in that it is in the option of the individual workman to steer completely clear of it, if he so wills : I refer to drink.

i p. 2596.

No man, whatever his trade, need drink more than is good for him, unless he pleases. Still there are, doubtlessly, trades in which the temptation to do so is so great that practically constant exposure to drink comes to be very much the same thing as constant exposure to such unavoidable poisons as mercury, lead, or phosphorus.

The trade most exposed to the pernicious effects of alcohol is, of course, that of the dealers in drink—innkeepers, publicans, and wine and spirit dealers; and I shall therefore confine myself to this group, merely saying that there are many other groups in the list in which the baneful effects of excessive indulgence are sufficiently evident.

The following table, then, sets forth the mortality of dealers in liquor from various diseases and from all causes in the aggregate, placed side by side for the purpose of ready comparison with the mortality of all males of corresponding ages in the country, the latter being taken as 1,000. The figures tell their own tale without further explanation. You will see that under every one of the special headings the mortality of the liquor dealers is vastly in excess of the average for all males, and that under one of them, namely, diseases of the liver, the mortality is more than six times as high as that of other men.

TABLE C.

COMPARATIVE MORTALITY of LIQUOR DEALERS and MEN generally.

Diseases.	Men 25 to 65 Years of Age.	
	Liquor Trade.	All Males.
Alcoholism	55	10
Liver Diseases	240	39
Gout	13	3
Diseases of nervous system	200	119
Suicide	26	14
Diseases of urinary system	83	41
Diseases of circulatory system	140	120
Other causes	764	654
All causes	1,521	1,000

(6.) The sixth cause of the contrast between different industries is to be found in the differences they present as regards liability to fatal accident. There are three occupations among those in my list which are pre-eminently liable to fatal accident, namely, mining, stone and slate quarrying, and sea-fishing. If we represent the deaths by accident of all males, of from 25 to 65 years of age, by 100, the mortality from the same cause for miners, so far as our death registers enable us to calculate, will stand at 269; that of stone and slate quarrymen at 222; and that of fishermen at 226; this last-given figure being doubtlessly somewhat below the truth, because the deaths of some fishermen, who are drowned and whose bodies are not recovered, escape registration.

Next to these, but far behind, among such occupations as have been examined by me, come men engaged in cab and omnibus service, and painters and glaziers, these latter being specially exposed to danger

of falling from scaffolding or other height, and the former having the dangers of driving through the overcrowded streets materially increased by their intemperate habits; for I find that in the course of the past year rather more than one in every 11 cabmen in London was convicted of drunkenness, and in no few cases was so convicted more than once.

(7.) The seventh and last cause of high mortality is exposure to inhalation of dust. The effect of this, speaking generally, is of course to increase the mortality from phthisis and from diseases of the lungs; but the effect differs very greatly, not only according to the amount, but also according to the character of the dust, that which consists of hard and sharp pointed particles naturally being more irritating to the air-passages than that of which the particles are soft or rounded.

TABLE D.

COMPARATIVE MORTALITY from PHTHISIS and RESPIRATORY DISEASES of MEN in various DUST-INHALING OCCUPATIONS.

Men from 25 to 65 Years of Age.	Phthisis.	Lung Diseases.	Phthisis and Lung Diseases.
Fishermen (as Standard)	55	45	100
Carpenters, joiners -	103	67	170
Bakers - - -	107	94	201
Wool-workers - -	130	104	234
Cotton-workers - -	137	137	274
Cutlers, scissors makers -	187	196	383
File makers - -	219	177	396
Masons, bricklayers -	127	102	229
Stone and slate quarrymen	156	138	294
Pottery makers - -	239	326	565
Cornish miners - -	348	231	579
Coalminers - -	64	102	166

Thus the dust of the ordinary kinds of wood, such as are commonly used by carpenters and joiners, appear to have very little, if any, baneful effect upon the air-passages, for the mortality of these artisans, both from phthisis and from diseases of the respiratory organs, is below the average for males generally.

The harder kinds of wood, however, such as are used by cabinet-makers, are said to give off a much more injurious dust than do the softer woods used by carpenters; and that this is so is not only probable *a priori*, but is supported by such scanty statistical evidence as I can adduce. For though I am unable to give the mortality of cabinet-makers from phthisis and respiratory diseases by themselves, their mortality from all causes together is considerably higher than that of carpenters, the mortality figure in Table A. for these latter being 148, while that of cabinet-makers and men generally in the upholstering business is 173. The dust of flour, again, of which millers, bakers, and confectioners necessarily inspire large quantities, appears to have no injurious effect upon vitality. It is indeed very doubtful whether

much of this flour-dust reaches the lungs, and is not arrested on the way by inter-mixture with the saliva and by adherence to the moist surface of the tongue and pharynx. At any rate, the mortality of bakers and confectioners from phthisis is scarcely above that of carpenters and joiners, and though their mortality from diseases of the respiratory organs considerably exceeds that of the other group of workers, this is probably not due to any irritation from the flour-dust, but to the heated atmosphere of the bakehouse, which contrasts strongly with the fresh out-of-doors air in which carpenters and joiners habitually work.

More injurious than either wood-dust or flour-dust appear to be the filaments and fluff and other dusts that are given off in textile factories; the mortality from phthisis, and from diseases of the respiratory organs, being much higher among workers in cotton and wool than among carpenters or bakers. The amount of dust given off in the cotton factories is much greater than that given off in most of the processes in the wool factories, owing to the wool being treated with oil; and, in both cotton and wool factories, the amount far exceeds that given off in silk mills, where dust is studiously avoided as injurious to the costly material.

Moreover, the dust in the cotton factories is not only more abundant, but is also of a more irritating character; for it consists not merely of filamentous matter, but contains a considerable intermixture of the mineral substances that are used in sizing, and mineral substances as will be presently seen are specially injurious to the lungs.

There are doubtlessly in addition to the dust other causes in operation in these factories, or at any rate in the cotton and the wool factories that tend to produce disease, and notably the high temperature of the weaving sheds. In this respect, again, the cotton factories are the worst off, the temperature in their sheds having been described in an official report as "tropical and relaxing." It is in accordance with these differences that while the mortality from all causes of men in the silk factories is represented by 152, in the woollen factories it is represented by 186, and in the cotton factories by 196 (Table A.).

As to the separate mortality from phthisis, and diseases of the respiratory system, I can give you no figures so far as concerns the silk mills; but in the wool factories the mortality, as is shown in Table D., is represented by 234, and is much higher than that of the carpenters and the bakers before dealt with, while that in the cotton factories is represented by 274.

Let us now pass on to those industries where the workman is exposed to the inhalation of mineral dust.

There are two industries given in the table in which the workman is specially exposed to the inhalation of metallic dust, namely, the manufacture of cutlery and file-making. In the former, the mortality from phthisis and diseases of the respiratory system stands at 383, and in the latter at 396; and doubtlessly had not such subsidiary operations as hafting been included in the cutlery manufacture, the mortality figure would have been still higher. Even as it is, it is nearly four times as high as that of fishermen, who work in an atmosphere perfectly free from dust.

Indeed, the mortality of cutlers and of file-makers from these diseases alone is almost as great as that of fishermen from all causes put together, including accident, to which, as we know, fishermen are specially liable.

Still more formidable in its effects upon the air passages appears to be the dust of stone. There are, in the table, four industries thus affected, namely, masons and bricklayers, stone and slate quarrymen, Cornish miners, and pottery makers. In all of these the mortality, both from phthisis and from lung diseases, is very high, but there are notable differences between them. Two of the four, the masons and the quarrymen, work in the open air, and their mortality from these diseases is only from two to three times that of fishermen, which is taken in the table as the standard; but the other two, the Cornish miners and the potters, work in more confined space, and consequently inhale the stone-dust in much larger amount, and for them the mortality from phthisis and lung disease is from five to six times as high as that of fishermen. I should rather say *was* five or six times as high; for I am informed that, in the ten years which have elapsed since the data on which my table is constructed were collected, much improvement has been made under the Factories and Workshops Act in the conditions under which potters carry on their work, and that a fresh collection of data, such as I hope to make when the present Census shall have been completed, will show a large diminution in the mortality of this industry.

There remains yet one industry among those exposed to inhalation of dust of which I have not yet said anything—I mean coal-mining. This I have reserved to the last, as requiring special consideration. Seeing the conditions under which coal-miners work, in a hot and dust-laden atmosphere, and their terrible liability to fatal accident, it might naturally be expected that their death-rate would be excessively high. As a matter of fact, this is far from being the case. Even when fatal accident is included their death-rate is by no means an excessively high one; and, putting accident aside, the death-rate from disease alone is exceptionally low, being almost exactly the same as that of agricultural labourers.

Limiting ourselves, however, only to phthisis and diseases of the respiratory organs, which are the affections to which coal miners are popularly supposed to be especially victims, we have the figures given in the last table; and it will be seen that, though the mortality of coal miners from respiratory diseases is somewhat high, it is by no means excessively so, and that their mortality from phthisis is far below that of men in other dust-inhaling occupations, and, indeed, is not very much above that of agriculturists, or even above that of fishermen, who enjoy all the advantages of a dust-free atmosphere.

This seems so strange that one would suspect that the figures given in the table must be for some reason erroneous, perhaps from being based on too scanty a collection of data; but that it is not so may be inferred from the fact that a similar conclusion as to the comparative immunity of coal miners from phthisis has been arrived at by, I believe,

all other, and, at any rate, by many other, persons both in this country and abroad who have investigated the subject.

Now, that coal dust should be less injurious to the lungs than the dust of stone or metal is readily intelligible; for, as Hirt has pointed out, the particles of coal when examined under the microscope are found to be, comparatively speaking, rounded off and free from sharp points and angles such as characterise the flint dust in a china factory.

This, however, clearly would only explain why coal miners are less subject to these diseases than workers in metal and stone, and not why they are scarcely more subject to them, taken together, than agricultural labourers, nor why their mortality from phthisis alone is very little above that of fishermen, who have been taken as the standard of comparison, because of their great healthiness.

The figures given in my table, supported as they are by the consentient evidence of all those who have personal experience of the diseases of miners, leave no possible doubt that for some reason or other coal miners are much less liable to phthisis than most other workmen, and that, even as regards lung disease generally, their liability is by no means so great as is usually supposed.

The question is, To what is this comparative exemption due? There are two possible explanations: one, that it is simply due to the picked character of the miners, inasmuch as none but strong men are likely to adopt so laborious a calling; the other, that there is some special preservative condition attaching to the industry; and, as the most notable of the conditions under which the coal miner works is the necessary inhalation of coal dust, or other matter given off from coal, it is to this that most writers who have adopted the second explanation attribute the comparative immunity. "It is in the highest degree probable," says Dr. Hirt, in his well-known treatise, "that coal dust "possesses the property of hindering the development of tuberculosis, "and of arresting its progress."

The exigencies of time prevent me from entering into discussion of the arguments for and against each of the two possible explanations. This much, however, I may say, that though a careful weighing of them has left me in doubt as to the side to which the balance inclines, a sufficient amount, at any rate, of probability attaches to the opinion expressed by Hirt to make it worth the while—I would indeed say, to make it the duty—of pathologists and scientific medical men generally to examine carefully into the question, to determine whether the opinion be really true, and, if it be, to ascertain what this preservative substance is, and whether it may not be such as is capable of being applied to others than those who work in the depths of the coal-pits.

De la Morbidité et de la Mortalité par Professions.

PAR

le Docteur JACQUES BERTILLON, Chef des Travaux Statistiques de la Ville de Paris, Membre Honoraire de la Société Royale de Statistique de Londres.

(Étude accompagnée d'une nouvelle table de mortalité par professions calculée d'après les *Annuaires statistiques de la ville de Paris*, 1885-89.)

La recherche de l'influence que la profession exerce sur l'état sanitaire de l'homme est un des problèmes les plus difficiles qui aient été posés à l'hygiéniste et au statisticien.

Nous présentons plus loin une table de mortalité par profession que nous avons calculée d'après les documents publiés par les *Annuaires statistiques* de la ville de Paris (1885-89). Cette table est la première qui ait été calculée en France ; elle a été précédée par deux tables anglaises et une table suisse que nous reproduisons plus loin.

Avant d'entrer dans l'examen de ces différentes tables, il convient de bien se convaincre que la mortalité est propre à nous faire apprécier l'état sanitaire d'une profession, et que la recherche de la morbidité par exemple ne serait pas aussi instructive.

Nous allons expliquer brièvement qu'en effet, une statistique des jours de maladie ne peut donner, dans l'état actuel des choses, qu'une idée infidèle de l'état sanitaire d'un groupe d'individus.

I.

De l'Insuffisance d'une Statistique des Maladies pour apprécier l'État sanitaire.

Les tables de morbidité sont peu nombreuses. Il en existe seulement deux en France, l'une recueillie par Gustave Hubbard en 1852, l'autre que j'ai calculée tout récemment d'après la statistique des ouvriers en soie de Lyon. En Italie, en Allemagne, en Danemark, elles ne sont guère plus nombreuses. En Angleterre, plusieurs, actuaires distingués en ont caculé.

Le tableau suivant contient les principales tables de morbidité.

TABLES DE MORBIDITÉ.—*Nombre moyen de jours de*

Âges.	Tables anglaises.								
	Sociétés d'amis écossaises *Highland Soc.*	Société ouvrière de Londres.	Sociétés d'amis anglaises.	Sociétés d'amis anglaises (masc.)	Sociétés d'amis anglaises (masc.)	Manchester Unity of Odd Fellows (masc.)			Foresters (masc.)
	Charles Oliphant.	J. Finlaison.	Ansell.	F. G. P. Neison l'ancien.	A. G. Finlaison.	Henry Ratcliffe.			F. G. P. Neison Junior.
	1820.	1829.	1835.	1836-1840.	1846-1850.	1846-1848.	1855-1860.	1866-1870.	1871-1875.
	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*i.*
20 à 25 ans	4.0	7.0	5.5	5.99	6.90	4.74	5.80	5.28	5.73
25 à 30 ans	4.2	7.0	5.9	6.23	6.90	5.30	5.74	5.64	5.97
30 à 35 ans	4.6	7.0	6.4	6.42	6.80	5.86	6.01	6.50	6.78
35 à 40 ans	5.0	8.5	7.3	7.25	7.64	6.58	7.02	7.44	8.05
40 à 45 ans	6.0	9.5	8.8	8.92	8.50	8.26	8.68	8.82	9,62
45 à 50 ans	8.3	9.5	10·8	11.42	10.06	10.60	10.81	11.45	11.95
50 à 55 ans	11.4	10.5	14.0	15.26	12.48	14.20	14.10	15.55	15.85
55 à 60 ans	14.9	13.5	19.7	21.32	15.24	22.42	21.20	21.30	22.48
60 à 65 ans	23.0	„	31.8	33.20	21.82	35.40	32.44	33.00	32.13
65 à 70 ans	55.6	„	62.7	70.20	32.39	45.45	50.19	50.60	55.80
70 à 75 ans	„	„	„	115.70	53.65	85.20	84.44	84.50	84.00
Âge inconnu	„	„	„	„	„	„	„	„	„
Tout âge	„	„	„	13.82	10.11	6.86	9.22	10.46	9.51

NOTES DU TABLEAU.—Col. *a* à *i*.—Dans les documents anglais, les jours de maladie sont notés en semaines et fractions de semaine. Nous avons réduit ces nombres en jours de maladie.

Col. *a* et *c*.—Les chiffres marqués dans ces deux colonnes se rapportent aux périodes d'âge suivantes : vingt et un à vingt-cinq ans ; vingt-six à trente ; trente et un à trente-cinq, etc., très peu différentes de celles qui sont marquées sur ce tableau.

Col. *e*.—A. G. Finlaison avertit son lecteur qu'il ne tient pas compte des " maladies chroniques."

Col. *j*, *k*, *l*.—Nous empruntons ces trois colonnes à l'excellente *Statistica della morbosità* qui les présente sous un forme un peu différente qui, elle-même, ne paraît pas être celle de l'original. Nous ne pouvons donc garantir que le texte des auteurs soit ici exactement reproduit.

Col. *n*, *o*, *p*.—Nous sommes seul responsable des chiffres que nous attribuons à Hubbard dans les deux colonnes *n*, *o*, car c'est nous qui les avons calculés d'après les documents qu'il a rassemblés. Leur total (consigné dans la colonne *p*) a été publié dans le livre d'Hubbard, mais ce n'est pas cette partie de son œuvre qui est généralement reproduite.

La table d'Hubbard, telle qu'elle est le plus souvent reproduite, donne des résultats intermédiaires entre ceux de la colonne *n* et de la colonne *o*. A l'époque où Hubbard écrivait, la plupart des sociétés de secours mutuels n'accordaient, pour les journées d'infirmité, que le *quart* de l'indemnité journalière qu'elles accordaient pour les journées de maladie. Pour faire ainsi, elles se fondaient notamment sur ce fait qu'une maladie aigüe empêche complètement de travailler, tandis qu'une maladie chronique ou une infirmité n'entrave pas trop l'exercice des professions tranquilles sédentaires. Quoi qu'il en soit, Hubbard, se plaçant au point de vue purement financier, a considéré, dans l'une de ses tables, *quatre* journées d'infirmité comme valant une journée de maladie. Cette table est celle que l'on reproduit le plus souvent et presque toujours on la reproduit sans y joindre l'explication nécessaire qui précède.

maladie en un an pour un sociétaire de chaque âge.

Tables allemandes.			Ouvriers de l'arsenal de Copenhague.	Tables françaises.				Tables italiennes.		
Assurance contre la maladie et l'invalidité de Leipzig.	Employés de chemin de fer.	Personnel circulant des chemins de fer.		25 sociétés mutuelles françaises (vers 1835-1849).			Ouvriers en soie Lyon (masc.)	162 sociétés de secours mutuels italiennes (masc.)	Sociétés mutuelles italiennes 1881-1885 (masc.)	
Heym.	Behm.	Behm.	Finger.	Gustave Hubbard 1852.			J. Bértillon 1890.	Bodio 1879.	Bodio 1890.	
1856-1875.	1870-1877	1870-1877.	1825-1840.	Maladies.	Infirmités.	Total $n+o$	1872-89.	Vers 1866-1875.	Résultats bruts.	Resultats corrigés,
j.	*k.*	*l.*	*m.*	*n.*	*o.*	*p.*	*q.*	*r.*	*s.*	*t.*
5.8	8.3	12.6	10.3	5.13	0.35	5.48	3.06	6.5	4.6	5.0
5.1	7.5	11.7	9.5	5.33	0.46	5.79	3.40	6.0	5.0	5.4
5.6	7.7	13.1	7.6	4.71	0.46	5.17	3.37	6.1	4.8	5.1
6.3	9.0	15.2	7.8	5.23	0.58	5·81	4.32	6.3	5.6	6.0
7.8	10.0	16.3	8.3	6.21	1.98	8.19	5.29	6.8	5.8	6.2
7.7	11.3	19.0	11 6	6.40	2.01	8.41	5.89	7.1	6.4	6.8
8.5	14.3	24.2	14.1	6.40	2.68	9.08	8.04	7.5	7.4	7.9
16.3	17.5	30.6		8.85	2.85	11.70	8.38	8.9	8.7	9.2
12.5	18.1	„	„	11.03	8.47	19.50	11.15	11.2	10.5	11.2
18.9	15.0	„	„	10.63	16.39	27.02	16.73	12.4	12.6	13.4
„	„	„	„	12.54	53.50	66.04	19.76	11.0	13.9	14.7
„	„	„	„	8.29	13.46	21.75	„			
„	„	„	„	6.21	2.49	8.70	7.8	6.9	6.2	6.6

Col. *q.*—Ces chiffres sont calculés d'après les *Comptes rendus annuels de la Société des ouvriers en soie de Lyon*. M. Fontaine calculera, d'après les mêmes documents, la morbidité par année d'âge, dans une table de morbidité qu'il prépare actuellement.

Col. *s* et *t*.—M. Bodio a fait subir à ses chiffres de la colonne *t* des corrections très ingénieuses afin qu'ils ne se ressentent pas de l'extrême variété des règlements adoptés par les diverses sociétés de secours mutuels.

Observation générale.—Outre les tables précédentes, nous trouvons les renseignements suivants dans les statistiques publiées par le Ministère de l'Intérieur de France en 1854 et 1855 :

Nombre de journées de maladie en un an pour un sociétaire.

	1854.	1855.
De 15 à 35 ans	4.9	4.9
De 35 à 55 ans	6.2	6.0
De 55 à 75 ans	9.2	10.0
De plus de 75 ans	15.8	16.5
Tout âge	6.1	6.1

Pour 1,000 *sociétaires de chaque âge, combien de décès en un an?*

Âges.	Tables anglaises.						Tables françaises.		Table italienne.
	Sociétés d'amis anglaises.	Sociétés d'amis anglaises (masc.)	Manchester Unity of Odd Fellows (masc.)			Foresters (masc.)	Sociétés mutuelles françaises.	Ouvriers en soie de Lyon (masc.)	Sociétés mutuelles italiennes (masc.)
	F. G. P. Neison l'ancien.	A. G. Finlaison.	Henry Ratcliffe.			F. G. P. Neison junior.	Hubbard.	Bertillon.	Bodio.
	1836-1840.	1846-1850.	1846-1848.	1856-1860.	1866-1870.	1871-1875.	Vers 1835-1849.	1872-1889.	1881-1885.
20 à 25 ans -	6.67	7.48	7.40	7.58	6.43	7.43	8.5	13.0	6.3
25 à 30 ans -	7.26	7.29	7.90	7.42	7.62	7.29	7.5	5.4	5.9
30 à 35 ans -	7.74	7.96	8.70	8.34	8.18	8.86	9.5	6.4	6·2
35 à 40 ans -	8.75	8.93	9.16	9.91	9.77	10.92	8.2	6.4	7.8
40 à 45 ans -	9.92	11.00	11.65	11.78	12.58	12.84	8.9	10.2	9.2
45 à 50 ans -	12·01	13.06	13.99	14.21	14.29	16.58	15.5	11.8	11.6
50 à 55 ans -	15.67	16.36	18.61	17.95	19.05	20.45	16.3	20.2	14·9
55 à 60 ans -	21.20	23.60	28.67	26.09	24.92	29.73	20.3	19.5	22.2
60 à 65 ans -	27.72	28.55	41.14	35.66	35.37	38.02	29.9	40.7	32.5
65 à 70 ans -	39.68	43.91	57.21	54·99	52.09	58.43	54.3	67.0	50.4
70 à 75 ans -	67.32	62.03	70.42	68.25	78.11	80.03	134.3	88.0	73.6
Âges inconnus	"	"	"	"	"	"	"	"	"
Tout âge -	12.54	12.57	9.75	11.89	12.63	12.14	14.2	23.5	11.7

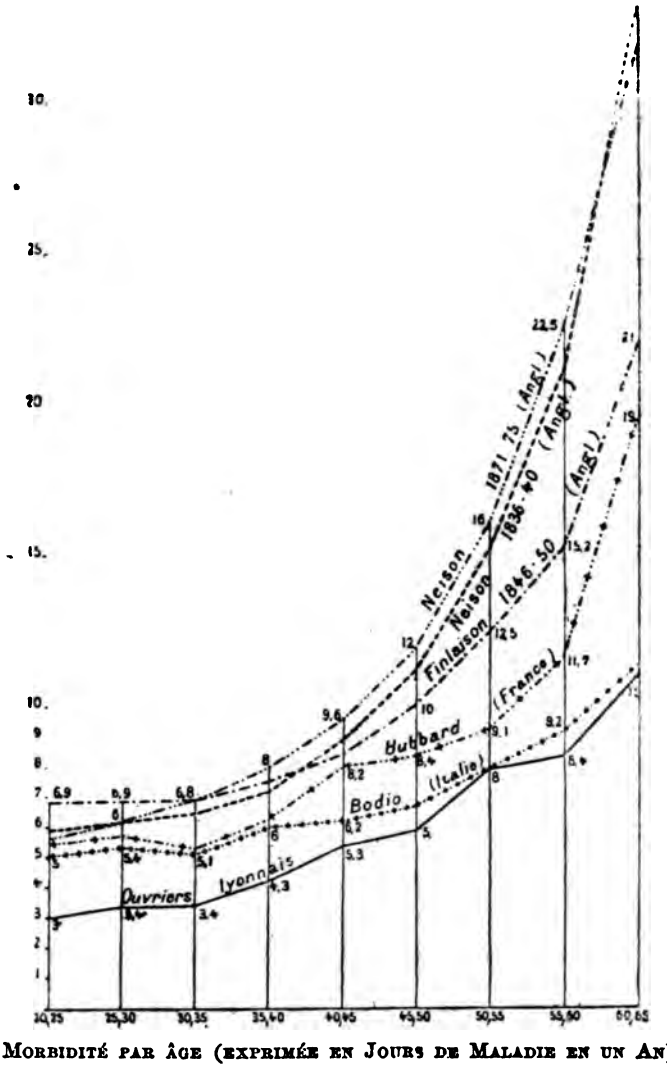
On est frappé des différences très considérables qui les séparent et qui feraient croire à un observateur superficiel que les mutualistes anglais ont une santé deux ou trois fois plus débile que les mutualistes français ou italiens. Il n'en est certes pas ainsi, et la preuve nous en est fournie par les tables de mortalité établies par ces mêmes sociétés; tandis que leur morbidité est entièrement différente, leur mortalité au contraire est tout à fait analogue. La différence qui sépare les tables de morbidité ne tient donc pas à la nature des choses, mais à des différences de définition, les sociétés anglaises n'attribuant pas au mot *maladie* le même sens que les sociétés françaises ou italiennes.

Rien n'est plus difficile en effet que de définir exactement le mot *maladie*. A quel caractère distinguer une maladie réelle, donnant droit à une indemnité, d'une simple indisposition? La plupart des sociétés françaises n'accordent d'indemnité que pour les incapacités de travail ayant duré plus de cinq jours par exemple: cette définition serait satisfaisante si elle était uniformément acceptée par toutes les sociétés, mais il n'en est pas ainsi. A quel caractère distinguer une maladie chronique d'une infirmité? Ici le problème est beaucoup plus difficile; le caractère admis par les philologues médicaux pour distinguer ces deux états, c'est que l'infirmité reste à l'état stationnaire, et ne end ni vers la guérison, ni vers une aggravation. Mais les définitions scientifiques n'ont rien de commun avec l'administration d'une société de secours mutuels.

En vain, on étudierait les statuts des sociétés de secours mutuels pour y chercher ce qu'elles comptent comme jours de maladie; on y trouvera bien les règles suivant lesquelles elles accordent ou refusent les indemnités mais il sera facile de reconnaître que, le plus souvent, ces règles n'expliquent pas les différences qui existent entre les différentes

tables. En voici un exemple. Hubbard, dans sa table, compte à la fois les journées de "maladie" et les journées "d'infirmité." Il semble donc que ses chiffres doivent comprendre tout les cas d'incapacité de travail. Cependant, l'actuaire anglais A. G. Finlaison ne compte pas les journées de maladie chronique. On pourrait donc croire que les chiffres d'Hubbard doivent être supérieurs à ceux de A. G. Finlaison. C'est pourtant le contraire qui est vrai. D'autre part, les tables de mortalité dressées par ces deux auteurs montrent que l'état sanitaire des mutualistes dont ils s'occupaient était en tout point comparable.

La vérité est que les sociétés de secours mutuels, lorsqu'elles accordent une indemnité de maladie, attachent moins d'importance au



MORBIDITÉ PAR ÂGE (EXPRIMÉE EN JOURS DE MALADIE EN UN AN).

Les chiffres marqués sur la figure indiquent le nombre annuel de jours de maladie dont un homme est atteint en moyenne à l'âge correspondant (marqué au pied de chaque ordonnée). Les longueurs prises sur chaque ordonnée sont proportionnelles à ces chiffres.

texte de leurs règlements qu'à l'état de leur caisse. Si la société est riche, elle accorde des indemnités plus libéralement que si elle est pauvre. De là et de là seulement vient que les grandes mutualités anglaises, qui sont souvent très anciennes et généralement riches, donnent plus de journées d'indemnité que les sociétés françaises par exemple, qui sont obligées à une rigoureuse économie.

Si les sociétés de secours mutuels, qui recrutent leurs membres dans une même profession, établissaient le recensement par âge de leurs membres, et des statistiques annuelles de leurs malades par âge, la science assurément profiterait de ces relevés, mais il est fort à croire que les tables de morbidité qui en résulteraient seraient influencées par l'état de prospérité de ces diverses sociétés plus que par le degré d'insalubrité des professions exercées. La direction générale de Statistique d'Italie a entrepris des recherches de ce genre ; nous verrons plus loin que les résultats qu'elle a obtenus ne concordent guère avec ceux que faisaient prévoir les tables de mortalité. Étant donné ce qui précède, nous ne pouvons pas être très surpris de cette contradiction.

Conclusion.—Une table de morbidité ne vaut pas, dans l'état actuel, une table de mortalité pour apprécier l'état sanitaire d'une collectivité quelconque. Cela vient de ce qu'il n'y a guère qu'une manière de comprendre le mot *mort*, tandis qu'il y en a beaucoup de comprendre le mot *maladie*.

II.

Difficulté de construire et d'interpréter une Table de Mortalité par Profession.

Cherchons donc si les tables de mortalité nous donnent quelques renseignements sur la mortalité par profession.

Les meilleurs documents que nous puissions consulter sont, sur ce point, deux tables anglaises, publiées la première, d'après les années 1860–1861, et d'après l'année 1871 par l'illustre William Farr, la seconde, d'après les trois années 1880–1882, par son très distingué successeur, le Dr. Ogle. Ces années ont été choisies pour cette recherche parce que ce sont les années où se sont faits des recensements. Elles donnent des résultats remarquablement concordants.

Une table de mortalité par profession a été faite en Suisse d'après les quatre années 1879–1882 (voisines du recensement de 1880) par M. Kummer.

Enfin, je suis l'auteur d'ue table de mortalité par profession d'après les documents recueillis par la ville de Paris pendant les cinq années 1885–1889 (voisines du recensement de 1886). C'est la première table de ce genre qui ait été faite en France.

Nous allons comparer les résultats de ces quatre tables, rapprochant les chiffres relatifs à chaque profession de la moyenne générale du pays observé. Le plus souvent nous trouverons que les mêmes professions donnent dans les trois pays des résultats analogues.

Nous rapprocherons ces résultats des deux tables de morbidité par profession dressées par M. Bodio, d'après l'observation des sociétés italiennes de secours mutuels.

Avant d'entreprendre ce travail de comparaison, il convient de se prémunir contre les causes d'erreur très nombreuses que vont nous présenter les chiffres.

Rien de plus délicat que la construction des tables de mortalité par profession. On peut véritablement dire qu'elles sont fondées sur le sable mouvant. En effet, le calcul de ce rapport : " Sur 1,000 bouchers, combien de bouchers décédés ? " suppose que l'on connaît : 1° le nombre des bouchers vivants ; 2° le nombre de ceux qui sont morts. Or, on ne peut connaître exactement ni l'un ni l'autre de ces deux nombres. En effet, au jour du recensement, un certain nombre de patrons bouchers croient répondre suffisamment au questionnaire en se déclarant " négociants," sans dire quel négoce ils font ; tandis que leurs garçons se déclarent " employés " sans dire à quel emploi ils sont consacrés. Ainsi on ne connaît pas bien exactement le nombre des vivants de chaque profession. On ne connaît pas mieux (et pour les mêmes raisons), le nombre des décédés de chaque profession.

Mais voici pis encore. A ce qui précède, il n'y aurait que demi mal si nous pouvions être certain que le même individu qui s'est déclaré pompeusement " négociant " au jour du recensement, sera désigné de la même façon au jour de son décès. Malheureusement rien ne nous garantit qu'il en sera ainsi.

En outre, il est fréquent qu'un individu exerce à la fois plusieurs professions ; en ce cas, il est prescrit de ne mentionner que la *principale*. Mais qui peut dire si la profession déclarée comme principale, au jour du recensement, sera jugée également principale au jour de décès ?

De ces difficultés vient l'extrême prudence avec laquelle William Farr a procédé pour la construction de ses tables. D'après les années 1860–1861, il n'avait consenti à calculer la mortalité que d'une vingtaine de professions choisies parmi les mieux définies. La concordance des résultats de 1871 avec les précédents l'a déterminé à étendre davantage ses recherches. le Dr. Ogle, quoique reconnaissant toute la difficulté du problème, a pu étendre ses investigations sur une centaine de professions.

La table suisse a de même été bornée volontairement à un nombre très restreint de professions.

Sur les 236 professions distinguées par le recensement parisien de 1886 et par les listes mortuaires élaborées sons notre direction, nous n'en avons conservé que 43 sur la table que nous publions actuellement, et encore ne pouvons-nous pas nous flatter d'avoir sur elles des renseignements bien rigoureusement exacts.

A cette difficulté s'en joint une autre spéciale à Paris, mais dont il est plus facile de se garer. La nomenclature distingue les professions industrielles des professions commerciales, mais cette distinction est en pratique très difficile, car l'industriel qui fabrique des chapeaux et le commerçant qui se borne à les vendre s'appellent tous deux, dans le langage courant, des *chapeliers ;* de même les mots *bonnetiers, drapiers, cordonniers, horlogers, bijoutiers,* etc., s'entendent à la fois de celui qui se borne à revendre. De là des confusions inévitables. Aussi, pour calculer les chiffres de notre tableau, nous avons toujours additionné les chiffres relatifs aux commerçants et aux industriels s'occupant des

mêmes marchandises. Ainsi fait la nomenclature anglaise, qui confond presque constamment les industriels, et les commerçants sous des titres génériques tels que "*engaged in the iron*," "*engaged in the wool industry*," etc.

Pour un certain nombre de professions, les chiffres sont exacts, mais ils résultent d'observations trop peu nombreuses pour nous permettre d'en tirer une conclusion certaine.

Enfin, supposons nos chiffres exacts et suffisamment considérables pour nous permettre de calculer des rapports sérieux. Les difficultés d'interprétation se dresseront devant nous.

Tout d'abord, il est essentiel que la mortalité des professions soit calculée par âge. En effet, si on ne distingue pas les âges, on trouvera que les propriétaires, par exemple, sont frappés par une mortalité considérable. Cependant leur profession, qui n'a rien de pénible, n'est pas davantage insalubre. Leur forte mortalité vient uniquement de ce fait que les propriétaires sont pour la plupart des hommes âgés, jouissant dans leur vieillesse de la fortune qu'ils ont acquise dans l'âge viril. Ils ont donc une mortalité de vieillards, parce qu'ils sont vieux en effet. Si l'on calcule leur mortalité âge par âge, on s'aperçoit que leur mortalité à chaque âge est des plus faibles. Réciproquement, si l'on calcule la mortalité des militaires sans distinguer les âges, on trouvera une mortalité faible; cela tient uniquement à ce que les militaires sont jeunes pour la plupart; si on calcule leur mortalité âge par âge, on s'aperçoit qu'elle dépasse la moyenne, et que, malgré les progrès de l'hygiène militaire, le métier des armes est encore assez insalubre.

Nous avons dû rejeter un grand nombre de travaux relatifs à la morbidité professionnelle et à la mortalité professionnelle, où cette distinction indispensable n'avait pas été faite. A notre avis, elles ne peuvent servir à rien.

Même une table de mortalité professionnelle avec distinction d'âge est très difficile à interpréter. Supposons les chiffres parfaitement exacts; supposons-les assez grands pour permettre des calculs concluants; supposons enfin que, pour une profession donnée, nous trouvions dans plusieurs pays des résultats analogues, notre tâche ne sera pas terminée. Il ne nous sera pas encore démontré que nous ayons l'expression du degré de salubrité de cette profession.

Voici, en effet, comment les choses se présenteront:

Un certain nombre de professions exigent que ceux qui les exercent soient vigoureux. Quoi d'étonnant si leur mortalité est faible? Cela ne signifiera pas que la profession en question est salubre, mais seulement que ceux qui l'exercent sont choisis parmi les plus forts du pays. Ici encore la distinction des âges nous sera précieuse. En effet, si la profession que nous venons de supposer est insalubre, nous verrons la mortalité rester faible dans la jeunesse (parce qu'alors la sélection des meilleurs fera encore sentir son effet), puis augmenter rapidement à partir de 25 ou 30 ans par exemple. Ce sera le signe que cette profession est insalubre. Mais ce signe lui-même pourra manquer lorsque la profession exige une telle vigueur que les hommes doivent choisir un autre métier dès qu'ils sont devenus valétudinaires. Dans

ce cas, les chiffres pourront nous tromper entièrement, et la mortalité de chaque âge pourra être faible, quoique se rapportant à une profession léthifère.

Réciproquement, les professions paisibles, celles qui ne nécessitent pas d'effort musculaire sérieux, sont recherchées par les individus les plus faibles qui n'ont ni le moyen ni le goût de se fatiguer beaucoup. Telles sont les professions de tailleur, cordonnier, horloger, etc. Quoi d'étonnant si elles donnent lieu à un nombre de décès assez élevé? Cette forte mortalité provient de la faiblesse native de ceux qui exercent la profession examinée, mais ne signifie nullement que cette profession soit insalubre. L'examen de la mortalité par âge nous sera ici d'un utile secours. Si la profession considérée est salubre en elle-même, nous trouverons une mortalité assez forte dans la jeunesse, puis (lorsque le stock des phtisiques et autres valétudinaires sera liquidé) une mortalité moins défavorable aux âges suivants.

Mais il n'en est pas toujours ainsi. Certaines professions faciles à apprendre sont le refuge des infirmes qui ont échoué dans toutes les autres. Tels sont les camelots, marchands ambulants, les journaliers, les soi-disant professeurs, etc. Ces professions sont frappées d'une forte mortalité à tous les âges sans qu'il en faille conclure qu'elles sont malsaines. Ce sont ceux qui les exerçent qui sont malsains.

Les difficultés que nous venons d'énumérer et qui rendent si dangereuses la construction des tables de mortalité par profession et leur interprétation, sont encore plus graves pour les femmes que pour les hommes. Aussi avons-nous, comme nos prédécesseurs anglais et suisse, renoncé à calculer aucun chiffre pour les femmes; nos tableaux ne s'appliquent qu'aux individus du sexe masculin.

On ne devra pas oublier dans cette comparaison que, toutes choses égales d'ailleurs, la mortalité moyenne à chaque âge est beaucoup plus forte à Paris que sur les montagnes de la Suisse ou même qu'en Angleterre. Donc, nous devons attendre que, toutes choses égales d'ailleurs, chaque profession présentera une mortalité plus élevée à Paris qu'en Suisse. De là résulte que, pour la comparaison que nous entreprenons, il faut avoir les yeux sans cesse fixés sur la mortalité moyenne du pays que l'on considère. Veut-on apprécier la mortalité des imprimeurs en Suisse? On compare la mortalité des imprimeurs suisses de chaque âge à la mortalité correspondante des Suisses en général; on trouve ainsi que cette mortalité est considérable. Veut-on ensuite voir s'il en est de même à Paris? On compare de même la mortalité des imprimeurs de chaque âge à la mortalité parisienne en général. On trouve ainsi que la mortalité des imprimeurs de Paris dépasse sensiblement la moyenne de Paris. Il en est de même en Angleterre, et nous devons conclure que cette profession est insalubre dans les trois pays étudiés.

En général, il en est ainsi, et les professions insalubres en Suisse et en Angleterre le sont également à Paris. Ainsi les imprimeurs, les charretiers et cochers sont frappés, en Suisse comme à Paris, d'une mortalité très forte. Au contraire les employés des postes et télégraphes n'ont qu'une mortalité des plus faibles.

III.

Comparaison des quatre principales Tables de Mortalité par Profession.

Examinons à présent la mortalité de chaque profession, en nous aidant des quatre tables que nous possédons, et parfois de quelques autres documents. Quand il y aura lieu, nous mentionnerons la table de morbidité des sociétés italiennes.

Industries Agricoles.

Cultivateurs.—Horticulteurs.—Maraîchers.—Pépiniéristes.—Gardes-chasse.

Professions agricoles.—En Angleterre, comme en Suisse, leur mortalité est des plus faibles. Les *jardiniers pépiniéristes* anglais ont une mortalité plus faible encore. A Paris, la mortalité des *horticulteurs maraîchers*, si nombreux à Grenelle, est égale à la mortalité moyenne.

Il faut remarquer, en Angleterre, la mortalité considérable des jeunes *farmers* de 15 à 25 ans. Elle est constante. Peut-être ces jeunes hommes, devenus propriétaires à un âge très jeune, c'est-à-dire ayant hérité des biens de leurs parents de très bonne heure, ont aussi hérité de leur santé (évidemment débile puisque ces parents sont morts ayant des enfants jeunes) et sont moissonnés par des maladies héréditaires.

Les domestiques de ferme on une mortalité très faible, mais un peu supérieure à celle de leurs maîtres.

Les *gardes-chasse* anglais, étant des hommes choisis, vigoureux, convenablement payés, libres de tout souci sérieux, et menant une vie active au grand air, jouissent d'une santé magnifique.

Résultat singulier : tandis que les agriculteurs jouissent évidemment, d'après les tables de mortalité anglaise et suisse, d'une santé enviable, ils seraient, d'après les mutualités italiennes, sujets à plus de jours de maladie que les ouvriers. Et ce résultat paradoxal se retrouve dans chacune des deux périodes étudiées.

En Suisse, comme en Angleterre, la phtisie est *deux* fois moins répandue parmi les agriculteurs et horticulteurs que parmi le commun des hommes. Il résulte de la table anglaise qu'il faut faire une différence entre les fermiers et leurs ouvriers. L'alcoolisme est plus répandu parmi les fermiers ; à sa suite, viennent les *maladies du foie* et le *suicide* (plus fréquents parmi eux que dans la moyenne anglaise). Les ouvriers de ferme et les jardiniers pépiniéristes n'ont pas le moyen ou n'ont pas le désir de s'enivrer aussi souvent : les maladies du foie et le suicide sont exceptionnellement rares parmi eux. Mais, plus exposés aux intempéries que les fermiers, ils succombent bien plus souvent aux inflammations des organes respiratoires.

Industries relatives à la Pierre, à la Chaux et au Sable.

Tailleurs de pierre.—Marbriers.—Maçons.—Gypseurs.—Briquetiers, Couvreurs en tuile et ardoise.

Les *tailleurs de pierre et marbriers* ont en Suisse une mortalité considérable due principalement, à la phtisie qui augmente chez eux

rapidement avec l'âge. Avant 20 ans, elle est plus rare que parmi l'ensemble de la population ; de 20 à 29, elle atteint la moyenne ; de 30 à 39, elle est double ; de 40 à 49, elle est triple ; de 50 à 59, elle est quadruple de ce qu'elle est dans l'ensemble des Suisses du même âge. (Voir le *Traité d'hygiène* de M. Proust.)

D'après la table de mortalité italienne, les "tailleurs de pierre et paveurs" compteraient moins de jours de maladie que la moyenne jusqu'à 45 ans, et sensiblement davantage après cet âge.

A Paris, les *marbriers, praticiens-sculpteurs et mouleurs* sont frappés par une forte mortalité à tout les âges.

Les "*maçons et briquetiers*" (*builders, masons, bricklayers*) ont en Angleterre, d'après la table de Farr, une mortalité sensiblement supérieure à la moyenne ; d'après la table du Dr. Ogle, une mortalité un peu moindre. La phtisie et les maladies de l'appareil respiratoire sont leurs causes de mort les plus actives ; on les attribue à la poussière qu'ils respirent, mais cette poussière est peu nuisible parce que la profession de maçon s'exerce en plein air. Quoique les maçons aient en Angleterre la réputation de boire, l'acoolisme, les maladies du foie et les maladies du système nerveux sont peu répandues chez les maçons. Les morts violentes ne sont pas rares.

Les "*maçons et gypseurs*" ont en Suisse une mortalité forte à tous les âges, dès l'âge de 15 ans. Chez eux comme chez les tailleurs de pierre, la phtisie augmente avec l'âge, mais elle ne peut être considérée comme un facteur important de la grave mortalité que nous venons de signaler, car elle est rare jusqu'à 40 ans, et ne dépasse sensiblement la moyenne qu'après 50 ans.

D'après les tables italiennes, les "maçons et badigeonneurs" compteraient un peu plus de jours de maladie que les autres mutualistes.

La statistique parisienne confirme les résultats qui précèdent, la mortalité des "maçons, tailleurs de pierre et couvreurs" est, à chaque âge, un peu supérieure à la moyenne.

Les *couvreurs en tuile et ardoise*, en Angleterre, avaient, d'après M. Farr, une mortalité plus élevée que d'après le Dr. Ogle ; celle-ci pourtant est assez élevée. Il en est de même des mouleurs et badigeonneurs (*plasterers, whitewashers*).

Industries des Métaux.

Fabricants de machines.—Fabricants de chaudières.—Forgerons.—Couteliers.— Fabricants de limes.— Fabricants d'aiguilles.— Armuriers.—Serruriers.—Fabricants d'instruments de physique, de chirurgie, de mathématiques.—Horlogers.—Orfèvres, émailleurs, ciseleurs, etc.

En Angleterre, les fabricants de machines (*engine and machine makers and millwrights*) ont une mortalité moyenne, anssi bien d'après W. Farr que d'après le Dr. Ogle.

Les *fabricants de chaudières* (*boiler makers*) ont exactement la mortalité moyenne.

Les *forgerons* sont notés en Angleterre comme ayant une mortalité un peu inférieure à la moyenne. La seule cause de mort qui dépasse un peu la moyenne chez eux semble être les maladies des organes respiratoires. Les maladies du système nerveux seraient au contraire un peu rares. L'alcoolisme est moyen. Les autres maladies, et notamment la phtisie, ont des chiffres très voisins de la moyenne. Il en est de même en Suisse pour les *forgerons et maréchaux*; cependant leur tendance à la phtisie est assez forte de 40 à 60 ans. A Paris, leur mortalité est des plus faibles. Il ne faut pas oublier que les forgerons sont choisis parmi les hommes les plus vigoureux.

Les *mécaniciens* ont en Suisse une mortalité moyenne et une tendance à la phtisie supérieure à la moyenne jusqu'à 40 ans. A partir de cet âge, leur état sanitaire devient préférable à la moyenne.

Les *couteliers* et surtout les *fabricants de limes* ont une mortalité extrêmement élevée, due principalement à la phtisie et aux maladies de l'appareil respiratoire. Les poussières métalliques en sont la cause; on attribue une grande importance aux poussières de pierre produites par les meules à aiguiser. Les maladies du système nerveux seraient nombreuses chez les couteliers et les fabricants de limes, cependant l'alcoolisme ne semble pas spécialement répandu parmi eux. Le saturnisme est extrêmement répandu chez les fabricants de limes parce qu'ils appuient l'acier qu'ils martèlent sur un coussin de plomb; les plombiers et les peintres sont deux fois moins sujets au saturnisme, que les fabricants de limes. En même temps que le saturnisme, se développent les maladies des reins.

Les *fabricants d'aiguilles*, d'après W. Farr, sont soumis, à tous les âges, à une mortalité extrêmement élevée.

La nomenclature ancienne confondait les *fabricants et marchands d'outils, de limes et scies* et leur attribuait une mortalité des plus élevées. De même en Suisse la "fabrication de machines et d'outils" entraîne à tous les âges une mortalité plus forte que la moyenne. La mortalité par phtisie notamment dépasse à chaque âge 500 décès annuels pour 100,000 vivants.

D'après les chiffres obtenus à Paris, la mortalité des individus attachés à l'industrie ou au commerce des métaux serait faible.

Les *armuriers* (*gunsmiths, gun manufacturers*) ne sont soumis en Angleterre qu'à une mortalité moyenne, tandis qu'à Paris les "fabricants "d'armes de chasse et d'armes blanches" seraient soumis (d'après des observations trop peu nombreuses) à la mortalité très élevée commune aux ouvriers qui liment le fer.

Les deux tables de morbidité d'Italie sont unanimes à attribuer une morbidité relativement élevée (6 à 8 jours annuels de maladie suivant l'âge) aux "armuriers, forgerons, ferblantiers, chaudronniers, maréchaux."

Les *ouvriers en étain* ont une mortalité inférieure à la moyenne et qui a sensiblement diminué en Angleterre.

Les ouvriers en *cuivre, plomb, zinc, laiton, etc.*, son confondus par la statistique anglaise sous une seule rubrique. Leur état sanitaire est

moins bon que celui des ouvriers en étain. Ils se rapprochent de la moyenne générale anglaise.

La *serrurerie* est en Suisse la profession la plus insalubre (avec celle des tailleurs de pierre dont nous parlerons plus loin). Dès l'âge de 15 à 20 ans, ils ont une mortalité double de la moyenne (8·8 décès pour 1,000 vivants au lieu de 4·8). Aux âges suivants, la mortalité dépasse de beaucoup la moyenne. La phtisie est un des facteurs principaux de cette forte mortalité. Dès l'âge de 15 à 20 ans, elle est triple de la moyenne (3·4 au lieu de 1·2). Puis, contrairement à ce qui arrive pour la masse des hommes, sa fréquence augmente avec l'âge au point d'atteindre, à l'âge de 50 à 59 ans, le taux de 12 décès annuels pour 1,000 vivants; nous retrouverons ce chiffre effroyable pour les tailleurs de pierre.

A Paris, la mortalité des serruriers est plus élevée que la moyenne, mais moins notablement qu'en Suisse.

Ce résultat doit évidemment être rapproché de celui que nous avons relevé pour les "fabricants d'outils, de scies, et de limes" et pour les "fabricants d'aiguilles" dont le métier consiste, comme celui des serruriers, à limer et user le fer. Ces ouvriers succombent aux accidents que l'on trouve décrits et expliqués dans le traité d'hygiène du professeur Proust.

En Angleterre, les *serruriers* et *poseurs de sonnettes* sont comptés sous la même rubrique que les *gaziers*. Leur mortalité était élevée à l'époque où observait W. Farr; elle était moindre, mais encore assez forte, d'après le Dr. Ogle.

Il semble qu'en Angleterre la mortalité des précisionnistes (*philosophical instruments makers*) soit élevée. D'après les documents parisiens, trop imparfaits sur ce point pour que nous puissions les publier, elle serait également considérable.

Les *fabricants et marchands d'instruments de musique* ont en Angleterre une mortalité moyenne (plutôt inférieure à la moyenne). Leur mortalité serait à Paris sensiblement inférieure à la moyenne (d'après des observations trop peu nombreuses pour être concluantes).

Les *horlogers* anglais ont une mortalité élevée de 20 à 25 ans; puis elle s'améliore d'année en année (moyenne de 25 à 35; faible de 35 à 55), enfin elle dépasse la moyenne dans la vieillesse. En Suisse, "l'horlogerie et la fabrication d'outils d'horlogerie" est moins favorisée; leur mortalité dépasse sensiblement la moyenne à tous les âges, elle ne s'en rapproche qu'après 60 ans. La phtisie est deux fois plus fréquente chez eux que dans le commun des hommes; l'excès des décès dus à la phtisie suffit presque à expliquer la grande mortalité des horlogers suisses.

Les *graveurs* et *doreurs*, d'après les documents anglais, auraient une mortalité plutôt supérieure à la moyenne.

La nomenclature parisienne (qui n'est autre que celle de la France en 1866) confond dans une même rubrique les "*orfèvres, bijoutiers, joailliers, lapidaires, émailleurs, horlogers, batteurs d'or, doreurs et argenteurs sur bois et sur métaux, fabricants de bronze, ciseleurs sur métaux.*" Nous y joignons comme nous faisons toujours "*les marchands*

d'orfèvrerie, bijoutiers, horlogers, objets en bronze," parce que dans la pratique il est très difficile de distinguer les *bijoutiers et horlogers* (*fabricants*) des *bijoutiers et horlogers* (*marchands*).

Le résultat final pour ces professions diverses indique une mortalité faible à tous les âges. Le résultat est donc très différent de celui que nous avions en Suisse et en Angleterre, mais il convient de remarquer que les ciseleurs, les bijoutiers, doreurs et batteurs d'or sont très nombreux à Paris et que les horlogers n'entrent dans nos totaux que pour une part relativement plus faible.

Les tables italiennes de morbidité confondent aussi dans la même rubrique les "orfèvres, joailliers, horlogers, ciseleurs et graveurs." De toutes les professions distinguées par la nomenclature italienne, c'est celle dont la morbidité est la plus faible.

L'horlogerie est une de ces professions sédentaires qui, n'exigeant pas de déploiement de force, et fatiguant les yeux plus que les muscles, attirent plus particulièrement les gens malingres et de mauvaise constitution. Ainsi s'explique peut-être leur forte mortalité en Suisse, pays où l'horlogerie est exercée même dans les campagnes : les hommes solides s'y vouent à la culture des champs, les souffreteux à l'horlogerie. Le fait que la mortalité des horlogers anglais est forte dans la jeunesse et faible plus tard, semble confirmer cette explication. En Suisse, la rubrique comprend "l'horlogerie et la fabrication d'outils d'horlogerie." On y doit joindre évidemment la *fourniture d'horlogerie ;* c'est donc un groupe de professions assez diverses, mais qui toutes exposent ceux qui les exercent à limer, user les métaux et à respirer des poussières métalliques. De là vient peut-être que la mortalité des horlogers suisses reste toujours assez forte, au lieu de diminuer avec l'âge comme en Angleterre.

Industries du Bois.

Menuisiers et charpentiers.—Scieurs de long.—Tourneurs.—Boisseliers, tonneliers.—Ebénistes, charrons.—Carrossiers.—Constructeurs de navire.—Fabricants de bouchons de liège.

Les menuisiers et charpentiers n'ont, d'après la statistique anglaise, qu'une mortalité très modérée, qui à tous âges est sensiblement inférieure à la moyenne. Toutes les maladies sont rares parmi eux.

La statistique suisse leur est moins favorable, et accuse une mortalité voisine de la moyenne et même un peu plus forte ; la phtisie a parmi eux une fréquence moyenne.

La statistique parisienne, moins favorable encore, leur attribue des chiffres assez forts de 30 à 50 ans.

D'après les deux tables italiennes de morbidité, le nombre de jours de maladie dont sont grevés les "menuisiers, carrossiers, charpentiers" serait légèrement supérieur à la moyenne.

Les scieurs de long (*sawyers*) ont en Angleterre une mortalité faible.

Boisseliers, tonneliers, coffretiers, tabletiers, etc. — D'après la statistique parisienne, les "*boisseliers, vanniers, coffretiers,*" n'auraient qu'une mortalité modérée.

La statistique anglaise confond les uns et les autres sous une même rubrique (*wood turners, box makers, coopers*) et leur attribue une mortalité élevée, qui s'observe aussi bien sur la table de W. Farr que sur celle de Ogle. Cet auteur s'étonne de voir les menuisiers (moins bien partagés à Paris) jouir d'une santé bien supérieure à celle des autres ouvriers en bois; il soupçonne les tonneliers d'intempérance, et s'accorde sur ce point avec la statistique suisse.

Industrie de l'ameublement.—L'importante industrie parisienne de l'*ébénisterie* est favorisée : sa mortalité est, à tous les âges, inférieure à la moyenne. Les *tapissiers* ont des chiffres analogues à ceux des ébénistes et même plus modérés encore.

D'après les deux tables anglaises, la mortalité des tapissiers, ébénistes (*upholsterers, cabinet makers, french polishers*) serait voisine de la moyenne, et plutôt élevée.

Industrie des moyens de transport.— Les constructeurs de navire en Angleterre avaient, d'après W. Farr, une mortalité un peu inférieure à la moyenne jusqu'à 35 ans, et un peu supérieure à la moyenne à partir de cet âge. En 1880–82 elle avait sensiblement diminué à tous les âges et la profession est considérée comme salubre.

Les *charrons* en Angleterre ont une mortalité plutôt faible, tandis que les *carrossiers*, auraient une mortalité sensiblement plus élevée, surtout après 45 ans.

Cette différence, qui se retrouve sur les deux tables, s'expliquera sans doute si l'on songe que les charrons exercent leur profession à la campagne et qu'en outre ils ne travaillent guère que le bois, tandis que les carrossiers exercent une profession urbaine, et travaillent le bois, le fer, le vernis, etc.

En Suisse, "*la charronnerie et fabrication de wagons*" se fait remarquer par une mortalité assez faible jusqu'à 60 ans ; la phtisie est assez peu répandue dans cette profession.

A Paris, la même rubrique englobe les "*carrossiers, charrons, selliers, bourreliers, marechaux-ferrants.*" L'ensemble de ces professions paraît frappé d'une mortalité élevée à tous les âges.

Les *fabricants de bouchons de liège* sont trop peu nombreux à Paris pour qu'on puisse tirer une conclusion de cinq années d'observation seulement. Disons seulement que leur mortalité paraît très élevée à tous les âges.

Industries des Tissus.

Filateurs.—Passementiers.—Cordiers.—Fabricants de tapis.— Tailleurs.—Chapeliers.

Industries textiles.—En Suisse, mortalité moyenne, et plutôt inférieure à la moyenne. La phtisie est plutôt rare, du moins jusqu'à 50 ans. La filature de la soie donne des résultats plus favorables que la filature du coton.

La statistique anglaise confirme ce dernier résultat, mais entre dans plus de détails.

Les *passementiers* assez nombreux à Paris, présentent des chiffres très voisins de la moyenne.

MM. Fleury et Reynaud ont écrit sur l'hygiène du passementier à Saint-Étienne un article excellent à tous égards;* ils décrivent l'état des ateliers qui sont élevés de plafond et aérés, les mouvements de l'ouvrier ; ils notent surtout la pression qu'il est à chaque instant obligé d'exercer sur son sternum (pression égale à la moitié du poids de son corps et qui finit par lui déformer le sternum, ainsi que le prouvent les pièces anatomiques dont ils publient la photographie). Ils notent, âge par âge, la cause des décès de passementiers pendant la période 1880–89. Il ne manque à leur étude qu'un point ; malheureusement il est essentiel : c'est le nombre des vivants à chaque âge, que le recensement n'a malheureusement pas relevé. Faute de ce renseignement, ils ne peuvent savoir si la profession de passementier est oui ou non insalubre. Ils notent seulement que la phtisie n'est pas plus répandue parmi eux que parmi les autres habitants de cette laborieuse cité. Au contraire, le cancer, et notamment le cancer de l'estomac, et la congestion cérébrale sont beaucoup plus fréquents chez les passementiers que chez les mineurs et armuriers de Saint-Étienne. MM. Fleury et Reynaud pensent que la pression exercée sur l'estomac peut contribuer à la fréquence du cancer de l'estomac. L'âge moyen des décédés est chez les passementiers 56 ans 6 mois ; il est supérieur à celui du mineur et de l'armurier. En résumé, l'état sanitaire du passementier stéphanois paraît satisfaisant. Si on lui évitait, par quelque disposition mécanique que les constructeurs pourront sans doute trouver, les pressions exagérées sur le sternum, on rendrait sans doute sa profession encore plus salubre. L'étude de MM. Fleury et Reynaud montre combien serait intéressant l'examen détaillé de chaque profession mis en rapport avec les causes de mort qui frappent cette profession. Mais, pour que cette étude devînt tout à fait fructueuse, il faudrait qu'elle fût éclairée par un recensement des professions par âges.

Les deux tables de morbidité italiennes s'accordent à assigner aux filateurs et passementiers une morbidité voisine de la moyenne.

Les *tailleurs* en Angleterre et en Suisse ont une mortalité élevée surtout au début de leur carrière. Elle se rapproche ensuite de la moyenne tout en lui restant supérieure. D'après la table suisse, leur aptitude à la phtisie est presque double de la moyenne.

Quoique la profession des tailleurs soit sédentaire et s'exerce toujours dans des lieux clos et parfois mal aérés, les hygiénistes n'y trouvent rien de particulièrement malsain. Aussi est-il possible que les résultats fâcheux que nous venons de consigner ne soient pas dus à la profession elle-même, mais à une sorte de sélection spontanée. La profession du tailleur est un de ces métiers tranquilles qui tentent naturellement les individus chétifs qui n'ont ni le moyen ni le goût de se livrer à une profession plus agitée.

---

* *La Loire médicale*, 15 juin 1890.

Telle est aussi l'explication que le Dr. Ogle invoque pour expliquer leur forte mortalité. La phtisie est chez eux fréquente en Angleterre, comme en Suisse. Les autres maladies de l'appareil respiratoire atteignent chez eux la moyenne (quoiqu'ils ne soient guère exposés aux intempéries). Les tailleurs ont en Angleterre une réputation d'ivrognerie que la statistique justifie jusqu'à un certain point. Les maladies du foie, celles du système nerveux, le suicide, sont en effet assez répandues parmi eux. Ainsi qu'on devait l'attendre, les morts par accident sont rares.

A Paris, les tailleurs (dont beaucoup sont des étrangers) sont soumis à une moindre mortalité. Jusqu'à 40 ans, leur mortalité peut passer pour faible, ce qui semble exclure la sélection des valétudinaires. Dans un âge plus avancé, la mortalité des tailleurs parisiens devient sensiblement supérieure à la moyenne.

Les tables italiennes, loin d'attribuer aux tailleurs une mauvaise santé, leur accordent une morbidité faible.

Les *fabricants de boutons* en métal, ivoire, porcelaine, etc., paraissent soumis à Paris à une mortalité très considérable. Beaucoup de ces ouvriers, notamment ceux qui font les boutons de nacre, respirent des poussières dures.

L'Angleterre ni la Suisse ne nous renseignent nullement sur l'état sanitaire de cette industrie.

Les *chapeliers* en Angleterre (*hatters, hat manufacturers*) auraient une mortalité considérable, surtout à partir de 25 ans.

Dans certaines spécialités, ils travaillent dans des étuves, mais leur mortalité élevée est surtout attribuée à l'intempérance et aux maladies du foie et du système nerveux.

A Paris, les chapeliers auraient au contraire une mortalité sensiblement inférieure à la moyenne.*

Sur la table de morbidité italienne, les chapeliers sont confondus avec les ombrelliers et les chaisiers. Leur morbidité serait légèrement supérieure à la moyenne.

Industries concernant le Règne animal.

Nourrisseurs. — Bouchers. — Tanneurs.—Corroyeurs.—Cordonniers et bottiers.—Selliers.—Poils et crins, sparterie.—Peignes et brosses. Barbiers, coiffeurs, perruquiers.

Les *bouchers* ont, en Angleterre, une mortalité très faible jusqu'à 25 ans, parce qu'on les choisit vigoureux. Il faut être très solide en effet pour assommer un bœuf, pour le découper rapidement en morceaux, ou pour porter de gros quartiers de viande au bout d'une perche. Mais la profession paraît bien insalubre, car, de 25 à 35 ans, la mortalité de

* Ainsi que nous le faisons quand nous le pouvons, nous additionnons les *fabricants* et les *marchands* parce que dans la pratique on ne peut guère les distinguer (ils s'intitulent, les uns et les autres, *chapeliers*). D'après le recensement, les fabricants sont à Paris de moitié *plus* nombreux que les marchands.

ces hommes vigoureux est déjà plus forte que la moyenne. Elle reste très élevée à tous les âges suivants.

La phtisie est fréquente parmi eux, mais l'intempérance et les maladies qui en résultent sont surtout cause de la grande mortalité des bouchers anglais; le suicide est très fréquent.

De même, en Suisse, la mortalité des bouchers reste faible jusqu'à 30 ans. Puis elle ne cesse de dépasser la moyenne. A tous les âges (excepté avant 20 ans), la phtisie est deux fois plus fréquente chez eux que chez les autres hommes.

A Paris, au contraire, la mortalité des bouchers est très voisine de la moyenne.

Les *nourrisseurs* (de vaches, pour le commerce du lait) auraient, d'après la statistique parisienne, une forte mortalité jusque vers 40 ans. Elle serait ensuite moyenne.

Industrie du cuir (*tanneurs, corroyeurs etc.*).—En Angleterre, leur mortalité, faible avant 35 ans, atteint la moyenne vers cet âge, puis la dépasse d'autant plus que l'âge avance. D'après la table parisienne, leur mortalité serait, à tous les âges, modérée.

Les selliers anglais ont une mortalité supérieure à celle des tanneurs et des corroyeurs.

La mortalité des uns et des autres, en Angleterre, est sensiblement plus faible en 1880–82 qu'elle ne l'avait été précédemment.

Les *cordonniers et bottiers* jouissent, en Angleterre, d'une mortalité faible à tous les âges qui contraste singulièrement avec la forte mortalité des tailleurs de ce pays. La phtisie, parmi eux, dépasse très sensiblement la moyenne; le suicide est fréquent, pourtant l'alcoolisme paraît assez peu développé. Les maladies des poumons sont bien au-dessous de la moyenne.

En Suisse, il en est de même; la mortalité des cordonniers ne dépasse la moyenne qu'après 50 ans, et encore la dépasse-t-elle peu. Leur aptitude à la phtisie n'est sensiblement supérieure à la moyenne qu'à partir de ce même âge de 50 ans.

A Paris, la mortalité des cordonniers est élevée à tous les âges, surtout après 50 ans.

En Italie, leur morbidité (*cordonniers, tanneurs, selliers, gantiers*) ne s'éloigne pas sensiblement de la moyenne.

Les industries relatives aux "*poils et crins, sparterie*" seraient soumises, d'après les documents parisiens, à une mortalité effroyable, surtout avant 30 ans; mais le petit nombre des observations, la mortalité paradoxale qui en résulterait, nous détournent de publier les chiffres.

Les fabricants de *peignes et brosses* sont soumis à une mortalité presque aussi exagérée.

Les *barbiers, coiffeurs et perruquiers* sont soumis, en Angleterre, à une mortalité très élevée à tous les âges. D'après un relevé jugé insuffisant, cette grande mortalité serait due surtout à la phtisie et aux maladies suites d'intempérance. Le Dr. Ogle remarque que les coiffeurs vivent dans un air confiné et chargé de poussières de rognure de cheveux (comparer avec la mortalité des brossiers, etc.).

A Paris, les coiffeurs sont soumis à une mortalité moindre; elle cotoie la moyenne sans la dépasser sensiblement.

Industries concernant le Règne végétal.

Meuniers.—Boulangers.

Les *meuniers*, en Angleterre, ont une mortalité faible jusqu'à 35 ans, moyenne de 35 à 45, et assez forte après 45 ans. En Suisse, même résultat; leur mortalité est faible jusque vers 40 ans, puis elle dépasse sensiblement la moyenne. La phtisie est *très rare* chez eux (comme chez les autres paysans) jusqu'à 30 ans, moyenne de 30 à 40 ans, puis assez fréquente.

Les tables italiennes attribuent aux meuniers, mondeurs et fabricants de pâtes (*mugnai, brillatori, pastari*) une morbidité faible jusqu'à 45 ans, et forte de 45 à 50 ans.

Les *boulangers* présentent, en Angleterre et en Suisse, des caractères analogues, quoique moins prononcés que pour les meuniers. En Angleterre, mortalité faible jusqu'à 35 ans, moyenne de 35 à 45, puis sensiblement supérieure à la moyenne. La grande cause de mort serait chez eux l'alcoolisme et les maladies qu'il engendre (maladies du foie, du système nerveux et surtout le suicide). La phtisie et les maladies de poitrine ne dépassent pas chez eux la moyenne.

En Suisse, mortalité un peu inférieure à la moyenne jusqu'a 30 ans, puis un peu supérieure, et enfin très forte après 60 ans. De même la phtisie reste de moyenne fréquence jusqu'à 40 ans, assez fréquente après cet âge, et exceptionnellement fréquente après 60 ans.

De même à Paris, leur mortalité reste moyenne jusqu'à 40 ans, et devient élevée après 50 et surtout après 60 ans.

La morbidité des boulangers est confondue sur les tables italiennes avec celle des individus exposés aux chaleurs d'un four (*fondeurs, chaufourniers*). Cette morbidité est élevée.

Industries des Produits chimiques.

Produits chimiques, teinture, couleur. — Teinturerie, blanchisserie, imprimeries de textiles.—Fabricants de chandelles, de savons.—Fabricants de colle forte, engrais.—Raffineurs de sucre.—Fabricants de papier.—Relieurs.

Produits chimiques. — En Angleterre, les "*manufactures de produits chimiques, de teinture* et de *couleur*," sont frappées à tous les âges, d'après W. Farr, d'une assez forte mortalité. D'après le Dr. Ogle, les "*teintureries, blanchisseries, imprimeries, etc., de textiles*" seraient soumises à une mortalité assez forte, surtout après 45 ans. Les *fabricants de chandelles, de savons* dépassent la moyenne après 45 ans; les fabricants de *colle forte, engrais* sont encore plus maltraités.

En Suisse, au contraire, la mortalité inscrite sous la rubrique "Produits chimiques," est à peu près moyenne, plutôt même au-dessous de la moyenne. La phtisie y a une intensité exactement moyenne.

A Paris, les fabricants de produits chimiques "*noir animal, vernis, cirage, colle, garance, couleurs, graisses pour voiture, huile de poisson, savons, toiles cirées, caoutchouc, etc., etc.,*" seraient frappés par une mortalité moyenne.

Les *raffineurs* (de sucre) auraient, d'après la statistique parisienne, une mortalité très voisine de la moyenne.

Les *fabricants de papier* jouissent en Angleterre d'un état sanitaire très satisfaisant à tous les âges. Leur mortalité était plus faible encore (surtout avant 45 ans) d'après la table du Dr. Ogle. La seule opération insalubre de cette fabrication est le rognage et le classement des chiffons, mais cette opération est toujours faite par des femmes, et nous ne calculons que la mortalité des hommes.

Les *relieurs* n'ont à Paris qu'une mortalité voisine de la moyenne, tandis qu'en Angleterre elle est plus forte encore que celle des imprimeurs. Elle tend d'ailleurs à diminuer. Les maladies causes de décès ne sont pas connues.

Professions exposées à l'Intoxication saturnine.

Verres et cristaux.—Poterie.—Plombiers.—Peintres.—Imprimeurs.

Verres et cristaux.—La mortalité des verriers est très élevée en Angleterre à tous les âges à partir de l'âge de 25 ans. Elle est faible au contraire de 20 à 25 ans.

Poterie.—Il en est de même des potiers; leur mortalité toutefois ne s'élève qu'après 35 ans, "C'est l'une des plus malsaines professions," dit avec chiffres à l'appui W. Farr. La phtisie et les autres maladies des organes de la respiration sont les principales causes de cette grande mortalité. Les conditions sanitaires où vivent les potiers varient beaucoup avec la spécialité à laquelle ils sont consacrés. En général, on doit attribuer leur forte mortalité à une fine poussière très irritante qui produit "l'asthme des potiers (*potters' asthma*), c'est-à-dire la bronchite chronique et l'emphysème, et qui développerait indirectement les maladies organiques du cœur. Les brusques variations de température favorisent aussi le développement des maladies de l'appareil respiratoire. Les décès par alcoolisme ont une fréquence moyenne; ceux par maladie du foie dépassent de peu la moyenne. Le docteur Greenhow déclare que les ouvriers potiers sont sujets à l'intempérance, mais moins qu'autrefois. Le saturnisme atteint les hommes adonnés à une certaine branche de cette industrie, le *trempage* (*dipping*). Les maladies du système nerveux et celles des reins dépassent cependant assez peu la moyenne.

Les *plombiers, peintres en bâtiments, vitriers*, en Angleterre, sont bien portants dans leurs jeunesse, mais plus ils vieillissent, plus leur mortalité dépasse la moyenne. De 45 à 55 ans, c'est une des professions les plus insalubres de l'Angleterre. Leur mortalité a d'ailleurs diminué sensiblement dans l'intervalle qui sépare les observations de W. Farr de celles du Dr. Ogle. La phtisie et les autres maladies de l'appareil respiratoire ne sont guère plus fréquentes que la moyenne. Mais le saturnisme, les maladies du système nerveux, le suicide, la goutte, les maladies de l'appareil urinaire sont très répandus. Ici comme chez les fabricants

de limes et les potiers, nous voyons le saturnisme accompagné d'une grande fréquence des maladies rénales. L'alcoolisme est assez fréquent chez les peintres, plombiers et vitriers; avec lui se développent les maladies du foie. Les maladies de l'appareil circulatoire sont fréquentes. Les accidents (chutes) sont presque deux fois plus fréquents que chez les maçons.

A Paris, la situation des *peintres et vitriers* n'est pas meilleure. Dès l'âge de 20 à 29 ans, ils sont frappés par une forte mortalité qui dépasse de plus en plus la moyenne.

Les "*rampistes, plombiers, plafonneurs, parqueteurs,*" font à Paris l'objet d'un compte à part; ils sont également frappés par une très forte mortalité.

Les *imprimeurs* ont en Angleterre, en Suisse, comme à Paris, une mortalité considérable à tous les âges. La statistique suisse nous apprend que la phtisie est chez eux *deux* fois plus fréquente, à chaque âge, que chez le commun des hommes. La statistique anglaise confirme ce résultat, et nous montre en outre que la phtisie est la seule maladie à laquelle on doive attribuer l'excessive mortalité des imprimeurs. Sans doute, on compte parmi eux quelques saturnins, mais ils sont en nombre presque insignifiant.* De plus les maladies du système nerveux et celles des reins (dont nous avons vu la grande fréquence chez les peintres et chez les autres professions exposées au saturnisme) sont rares chez les imprimeurs. L'alcoolisme et les maladies du foie et des organes de la circulation sont rares parmi eux.

Le Dr. Ogle attribue leur forte mortalité par phtisie à l'air confiné, généralement chargé de mauvaises odeurs et de poussières (matières métalliques et surtout encre grasse desséchée), dans lequel ils exercent leur industrie. Elle est soumise en Angleterre à une certaine surveillance, mais il est douteux que ce soit à cette surveillance que soit due la diminution (réelle cependant) de leur mortalité, qui est encore actuellement très élevée.

Transports.

Bateliers.—Pêcheurs.—Cochers.—Charretiers.—Chemins de fer.—Portefaix.—Postes et télégraphes.

Pêcheurs.—Leur état sanitaire, d'après la statistique anglaise, est satisfaisant. De toutes les professions c'est, après celle des mineurs, celle qui compte le plus de morts violentes. Naturellement, la submersion est de ces morts tragiques la plus ordinaire. La phtisie et les autres maladies de l'appareil respiratoire sont *deux fois moins* fréquentes chez eux que chez le commun des hommes. L'alcoolisme est peu répandu. Les maladies de l'appareil urinaire sont remarquablement rares. Mais les maladies de l'appareil circulatoire sont fréquentes, ce que le Dr. Ogle attribue aux émotions violentes que doit provoquer une profession aussi

* On me dit que les caractères d'imprimerie dont on fait usage en Angleterre sont en une substance plus dure que ceux du continent et qu'ils contiennent moins de plomb.

dangereuse ; sans doute il vaudrait mieux attribuer ces maladies au rhumatisme que peut provoquer sans doute le fait d'être mouillé et transi pendant des journées entières ; mais le document ne nous renseigne pas sur la fréquence du rhumatisme chez les pêcheurs.

Les *bateliers* anglais (*bargemen, watermen*) auraient une mortalité élevée (que l'on retrouve à Paris pour les mariniers et aussi pour les agents chargés d'entretenir et de surveiller les canaux), mais les chiffres parisiens s'appuient sur trop peu d'observations pour mériter d'être reproduits.

Les cochers, rouliers, camionneurs sont sujets à une très forte mortalité qu'il convient d'étudier spécialement.

En Angleterre, on distingue les *cochers* (*coachmen, cabmen, not domestics*) et les *charretiers* (*carmen, carriers, carters, draymen*). Tous deux ont une mortalité tellement élevée qu'on peut qualifier cette profession l'une des plus insalubres de l'Angleterre. Des deux, la plus insalubre est celle du cocher (le cocher de bonne maison est exclu, car il jouit d'une santé excellente), probablement parce que le cocher est forcé de rester assis sur son siège par tous les temps et par toutes les saisons, tandis que le charretier peut marcher à côté de ses chevaux, et se réchauffer par le mouvement.

A Paris, on trouve des résultats analogues. Les deux professions sont frappées par une forte mortalité, mais les cochers de fiacre sont encore plus frappés que les " voituriers et charretiers," dont la mortalité semble même devenir normale après 50 ans.

La statistique anglaise nous renseigne sur les causes de mort des cochers de fiacre et d'omnibus.

Leurs organes digestifs sont en bon état, mais tous leurs autres organes sont sujets à de fréquentes maladies. Ainsi qu'on devait s'y attendre, les maladies des organes respiratoires tiennent le premier rang. La phtisie est très fréquente. L'alcoolisme est prodigieusement développé et à sa suite les maladies du foie, celles des organes urinaires, celles du système nerveux et de l'appareil de la circulation. La goutte est fréquente parmi les cochers. Les morts par accident dépassent sensiblement la moyenne.

En Suisse, le " camionnage et voiturage " donne lieu à une mortalité des plus élevées (presque double de la moyenne). La phtisie n'est pas le principal facteur de cet excédent de mortalité, car jusqu'à 30 ans elle est plutôt rare parmi les cochers et camionneurs suisses ; elle dépasse après cet âge la moyenne, sans atteindre, il s'en faut de beaucoup, le niveau élevé que nous avons constaté chez les tailleurs de pierre, les serruriers et horlogers, par exemple.

Quoique la profession de cocher soit manifestement insalubre (et notons qu'il faut être vigoureux et musclé pour panser et atteler les chevaux, et que la sélection devrait tendre à diminuer la mortalité propre à cette profession), la table italienne de morbidité leur assigne peu de jours de maladie tant qu'ils sont jeunes. Ce n'est qu'après 45 ans que leur morbidité dépasserait sensiblement la moyenne.

Les mécaniciens et hommes d'équipe des *chemins de fer* (*railway engine drivers, officers, servants*, etc.) auraient en Angleterre une

mortalité très élevée. D'après les chiffres suisses, leur mortalité ne serait un peu élevée que jusqu'à 30 ans ; passé cet âge, leur mortalité serait faible ; ils auraient *très peu* de propension à la phtisie.

Les employés des *postes et télégraphes*, en Suisse, ont une mortalité qui se calque en quelque sorte sur la moyenne ; à Paris, leur mortalité est plutôt inférieure à la moyenne.

Commerce de l'Alimentation.

Brasseurs.—Malteurs.—Hôteliers, marchands de vins, restaurateurs. —Garçons de liquoristes.—Marchands de volaille.—Marchands de poisson.—Fruitiers.—Confiseurs, glaciers, chocolatiers.

Les *brasseurs* ont, à Paris, comme en Angleterre, une forte mortalité à tous les âges. D'après les documents anglais, la phtisie et les autres maladies des organes respiratoires sont chez eux très répandues ; mais la grande cause de mort est l'alcoolisme et les maladies du foie et du système nerveux qui en résultent.

Les fabricants de *malt* ont, au contraire, en Angleterre, une mortalité inférieure à la moyenne.

Hôteliers, marchands de vin, traiteurs et restaurateurs.—En Suisse, leur mortalité (et notamment leur mortalité par phtisie), l'emporte de beaucoup sur la moyenne de 30 à 60 ans. Avant cet âge, elle est moyenne.

Il en est exactement de même à Paris.

En Angleterre, leur mortalité dépasse celle de toutes les autres professions. M. Ogle fait remarquer que les résultats qu'il obtient concordent avec ceux qu'a observés l'actuaire John Scott, d'après les expériences de la *Scottish Amicable Life Assurance Society* (1826–76). Naturellement, c'est l'alcool qui est la cause du mal : les maladies du foie sont plus fréquentes parmi les marchands de liqueurs, que ne l'est la phtisie elle-même dans le commun des hommes. Les maladies des organes urinaires, celles du système nerveux, le suicide, la goutte, dépassent de beaucoup la moyenne ordinaire. Les maladies du système digestif atteignent la moyenne sans dépasser.

Les *fruitiers* (marchands de beurre, œufs, lait, fromage, poisson, volaille, fruits et légumes) auraient, à Paris, une mortalité des plus faibles. En Angleterre, elle dépasserait au contraire la moyenne. La statistique anglaise distingue les marchands de volaille (*poulterers*), dont la mortalité serait véritablement énorme, et les marchands de poisson (*fishmongers*), qui ne seraient guère plus favorisés.

Les *épiciers* ont, en Angleterre et à Paris, une mortalité des plus faibles. La phtisie, les maladies du système respiratoire, circulatoire, et nerveux sont peu répandues parmi eux ; cependant l'alcoolisme et les maladies du foie sont fréquentes chez les épiciers anglais ; le suicide n'est pas rare.

Les *confiseurs, glaciers, chocolatiers* auraient, d'après la statistique parisienne, une mortalité assez élevée à tous les âges.

Les *tobacconists* (ouvriers en tabac, et surtout marchands de tabac) ont, en Angleterre, de 20 à 45 ans, une mortalité assez forte qui devient

ensuite voisine de la moyenne. Cette mortalité est un peu moins forte d'après la table du Dr. Ogle.

Autres Professions commerciales.

Banquiers.—Négociants et boutiquiers.

Ces professions sont, comme nous l'avons dit, mal définies, à cause du peu de précision avec laquelle la plupart des commerçants indiquent leur profession.

La statistique suisse comporte la rubrique générale suivante: "*Commerce proprement dit, banques-agences*;" la mortalité propre à cette profession est à tous les âges un peu supérieure à la moyenne; la phtisie est assez fréquente.

En Angleterre, la mortalité des employés de commerce et des employés d'assurance (*insurance service and commercial clerks*) serait forte à tous âges.

Celle des *voyageurs de commerce* serait forte aussi, mais moindre pourtant que la précédente. L'alcoolisme est très répandu parmi les voyageurs de commerce anglais, et par conséquent les maladies du foie, celles du système nerveux, le suicide sont fréquents. La goutte se rencontre assez souvent. La phtisie dépasse de peu la moyenne. Les maladies des appareils circulatoire, respiratoire et digestif sont plutôt rares.

A Paris, la mortalité des *négociants et employés* (de banque, d'assurance et en général) serait, comme en Suisse et comme en Angleterre, sensiblement supérieure à la moyenne. Il en serait de même des employés en *bonneterie et nouveautés*.

Quoique la concordance de tous ces résultats soit digne d'être notée, nous devons avouer que, pour les motifs indiqués au début de cet article, ils ne nous inspirent qu'une confiance médiocre.

Professions libérales.

Clergé.—Hommes de loi.—Médecins.—Pharmaciens.—Professeurs.—Musiciens.—Ingénieurs.—Architectes.

Le clergé protestant anglais (distingué en deux rubriques: *clergymen* et *protestant ministers*) jouit d'un état sanitaire très satisfaisant. De toutes les professions, c'est la moins frappée par la mort. L'existence régulière, assurée et suffisamment active des pasteurs explique sans doute le privilège dont ils jouissent. Leur mortalité, quoique très faible déjà d'après M. W. Farr, a été moindre encore en 1880–82.

Les prêtres catholiques anglais ont une mortalité faible, mais plus forte pourtant que les pasteurs. Dans la vieillesse, leur mortalité dépasse même la moyenne.

Quoique les observations parisiennes soient peu nombreuses, on doit remarquer qu'elles confirment entièrement la conclusion qui précède. La mortalité des prêtres catholiques (nous réunissons le clergé régulier et le clergé séculier, dont la mortalité paraît analogue) est très faible

jusqu'à 50 ans. Puis elle atteint et dépasse même la moyenne. William Farr attribuait au célibat le fait que la mortalité des prêtres catholiques l'emporte sur celle des pasteurs.

En Suisse, la mortalité du clergé (protestant et catholique) est également très faible.

Les Anglais distinguent les *avocats plaidants* (*barristers*) dont la mortalité serait des plus faibles, et les *avoués* avec leurs clercs (*solicitors and attorneys*) ; ceux-ci, dont le nombre en Angleterre dépasse de beaucoup celui des *barristers*, auraient, une mortalité moyenne.

D'après les chiffres recueillis à Paris la mortalité des avocats serait un peu inférieure à la moyenne. Celle des *officiers ministériels et de leurs clercs* serait plutôt un peu supérieure. Ces résultats, quoique conformes à ceux que nous venons de voir en Angleterre, ne nous inspirent qu'une confiance relative.

Les *magistrats* auraient à Paris une mortalité des plus faibles, mais les observations qui les concernent sont trop peu nombreuses pour permettre d'affirmer ce résultat, si vraisemblable qu'il soit d'ailleurs.

Les *clercs* d'étude (*law clerks*) auraient en Angleterre une mortalité des plus élevées. A Paris, la mortalité des clercs d'officiers ministériels est également supérieure à la moyenne.

Les *médecins et chirurgiens* anglais ont à tous les âges une mortalité très supérieure à la moyenne (égale à celle des carriers), ce qui ne saurait surprendre si l'on réfléchit à l'insalubrité de leur profession. Il en est de même en Suisse. La phtisie n'est pourtant pas beaucoup plus répandue parmi eux que dans l'ensemble de la population. Mais s'ils ne profitent pas eux-mêmes de leurs connaissances en hygiène, ils en font profiter leurs enfants, car dans aucune profession (excepté les instituteurs) la mortalité des enfants de 0 à 1 an n'est aussi faible.

A Paris, la mortalité des médecins est au contraire très faible à tous les âges. Ce résultat est moins contradictoire avec le précédent qu'on ne pourrait le croire au premier abord. La majorité des médecins anglais et surtout des médecins suisses sont tout naturellement des médecins de campagne, exposés à parcourir des distances considérables par les temps les plus rigoureux dans de petites voitures découvertes que le plus souvent ils conduisent eux-mêmes ; il n'est donc pas surprenant que leur mortalité soit élevée, car nous avons vu combien est forte celle des cochers. Les médecins parisiens mènent une existence entièrement différente et sont beaucoup moins exposés aux intempéries.

Les *pharmaciens* anglais (*chemists, druggists*) avaient, d'après W. Farr, une mortalité à peu près aussi élevée que les médecins.

Depuis cette époque, leur situation s'est améliorée tout en restant mauvaise.

A Paris, les "pharmaciens et herboristes" semblent avoir une mortalité plus faible encore que celle des médecins parisiens.

Les *professeurs* (*schoolmasters, teachers, professors*, etc.) jouissent, en Angleterre d'un état sanitaire assez satisfaisant. Leur situation était moins bonne au temps de W. Farr. Leur mortalité était faible jusqu'à 55 ans, puis elle dépassait la moyenne.

En Suisse, il en est exactement de même pour les "*instituteurs*;" leur mortalité, faible jusqu'à 60 ans, devient ensuite considérable. La phtisie n'est ni plus ni moins fréquente parmi eux que parmi le commun des hommes. Leur enfants n'ont qu'une mortalité des plus faibles.

La statistique parisienne distingue les instituteurs et professeurs attachés aux établissements *publics* d'instruction; leur mortalité est des plus faibles à tous les âges tandis que la mortalité des professeurs spéciaux (de musique, de danse, d'escrime, etc.) serait considérable. Il est possible que ce dernier résultat vienne de ce qu'un grand nombre d'individus sans profession bien définie se disent professeurs sans avoir de droits suffisants à ce titre.

C'est pour une raison analogue qu'en Angleterre les *musiciens, maîtres de musique*, ont une mortalité effroyable. L'exercice de cet art agréable n'a pourtant rien de dangereux, mais la musique est une *profession refuge*. La statistique anglaise compte parmi les musiciens même les joueurs d'orgue de barbarie.

Les *ingénieurs civils* en Angleterre ont une mortalité moyenne jusqu'à 45 ans, faible à partir de cet âge.

Les *architectes* à Paris ont une mortalité très faible jusqu'à 40 ans, moyenne à partu de cet âge. La statistique anglaise les confond sous la même rubrique que les *sculpteurs, graveurs, et autres artistes*. La mortalité que l'ont obtient ainsi est élevée, mais elle concerne une profession trop vaguement définie pour qu'on doive admettre son exactitude.

IV.

Conclusions.

Au cours de cette étude, nous avons dû adopter l'ordre suivi dans les différentes nomenclatures de profession adoptées par les statistiques. Nos conclusions seront plus faciles à formuler et prendront un caractère plus général si nous suivons un ordre plus approprié aux vues de l'hygiène.

Les professions, considérées au p int de vue de leur degré de salubrité, peuvent être classées sous les chapitres suivants:*

---

* Le Dr. Ogle admet les sept catégories suivantes: 1° Travaux qui s'exécutent dans une position ramassée, et spécialement ceux qui opposent un obstacle à l'action des organes thoraciques; 2° Surmenage, et spécialement efforts musculaires et mouvements soudains; 3° Industries qui emploient des substances nuisibles telles que le plomb, le phosphore, le mercure, des objets souillés, etc.; 4° Travaux qui s'exécutent dans les locaux mal ventilés et surchauffés; 5° Excès alcooliques; 6° Probabilité d'accident; 7° Exposition à l'inhalation de poussières de diverses natures.

Cette division du sujet s'éloigne peu de celle que nous adoptons.

Le Professeur Proust (*Traité d'hygiène*) divise les professions suivant la nature des accidents pathologiques qu'elles peuvent provoquer. Quoique cette classification soit très logique, surtout au point de vue médical, nous n'avons pu la suivre que d'assez loin dans cette étude, parce que nous avons surtout recherché le degré de nocivité des différentes professions.

1.—Professions exposant l'Homme aux Intempéries, tout en le contraignant au Repos.—Tels sont notamment les professions de *cocher*, et, à un moindre degré, de *charretier*. Nous avons vu que ce sont les plus malsaines de toutes.

2.—Professsions exposant l'Homme aux Intempéries, mais sans le contraindre au Repos.—Autant les précédentes sont dangereuses, autant celles-ci sont généralement salubres; telles sont les professions de *cultivateur*, *maraîcher*, *pépiniériste*, *garde-chasse*, etc. Les *pêcheurs sur mer*, les *bateliers* rentrent à certains égards dans cette catégorie.

3.—Professions exposant l'Homme à respirer des Poussières dures, mais à l'Air libre.—Tels sont les *tailleurs de pierre*, *marbriers*, *praticiens-sculpteurs*, etc., les *carriers*, dont la mortalité est très élevée. Les *maçons*, les *couvreurs en tuile et ardoise*, etc., qui se rattachent jusqu'à un certain point à cette catégorie, ont une mortalité un peu moindre que les précédents.

4.—Professions exposant l'Homme à respirer des Poussières dures, mais dans l'Air confiné.—Ces professions exposent à une mortalité au moins aussi élevée que celles de la catégorie précédente, quelle que soit la nature de la poussière respirée, que celle-ci soit métallique (*machines et outils*, *serruriers*, *armuriers*, *instruments de précision ou de chirurgie*, *couteliers*, *fabricants d'aiguilles*, etc.), ou qu'elle soit rocheuse (*potiers*, etc.), ou qu'elle soit d'origine animale (*brossiers*, *poils et crins*, *coiffeurs*, etc.).

5.—Professions exposant l'Homme à respirer des Poussières molles.—Ces professions sont généralement moins insalubres que les précédentes (*meuniers*, *boulangers* ,*filateurs*, *ramoneurs*, etc.).

6.—Professions exposant l'Homme à une Chaleur exagérée, à la Fumée, à la Vapeur, etc.—Les *forgerons* jouissent d'un état sanitaire satisfaisant à Paris, moins satisfaisant en Angleterre et surtout en Suisse. Les *mécaniciens* ont une mortalité moyenne. Les *boulangers* doivent sans doute leur mortalité un peu élevée aux poussières qu'ils respirent; les *verriers* et *cristalliers*, aux substances qu'ils travaillent.

7.—Professions exposant l'Homme à absorber des Substances nuisibles.—Telles sont les professions qui exposent au saturnisme (telles sont selon la fréquence de l'empoisonnement: les *fabricants de limes*, les *peintres*, les *potiers*, les *plombiers*, les *imprimeurs*, etc.), les professions qui exposent à l'absorption du phosphore, du mercure et autres poisons minéraux ou à l'absorption de poisons végétaux (*tobacconists*) ou encore celles qui mettent l'homme en contact avec des matières corrompues (*bouchers*, *tanneurs*, etc.). La mortalité dans ces différentes professions est généralement considérable.

8.—Professions exposant l'Homme à la Tentation de l'Alcool.—En premier lieu, il faut classer ici les *marchands de vin* et *hôteliers* dont la mortalité à Paris paraît moindre qu'en Suisse ou en Angleterre. Les *brasseurs* anglais ont une mortalité moindre.

9.—Professions exposant l'Homme à de nombreux Accidents. —Les mineurs de charbons et de fer auraient une mortalité extrêmement favorable sans les nombreux accidents qui les déciment. Il en est de même des *pêcheurs sur mer*. Les *mineurs cornouais* et les *carriers* sont très exposés aux accidents, mais d'autres causes de mort très actives élèvent leur mortalité.

10.—Professions sédentaires.—Parmi elles, il en est de très favorisées, et d'autres au contraire qui sont très frappées par la mort. L'état sanitaire de ces professions paraît dépendre notamment de ce que beaucoup d'entre elles sont exercées dans l'air confiné ; il dépend aussi de ce que ceux qui les exerçent sont recrutés parmi les plus faibles de la population. Parmi les professions sédentaires où la mortalité est faible, il faut citer les *fruitiers*, les *épiciers*, etc., au contraire, les *marchands de nouveautés*, les *marchands de poisson*, etc., sont soumis à une mortalité moyenne. Les *tailleurs* sont soumis à une mortalité élevée, qui paraît moindre pour les *cordonniers*, les *horlogers*, les *graveurs, etc.*

Les *banquiers, changeurs et leurs employés* seraient soumis, d'après les quatre tables, à une mortalité supérieure à la moyenne, mais nous n'avons cependant admis ce résultat qu'avec réserve.

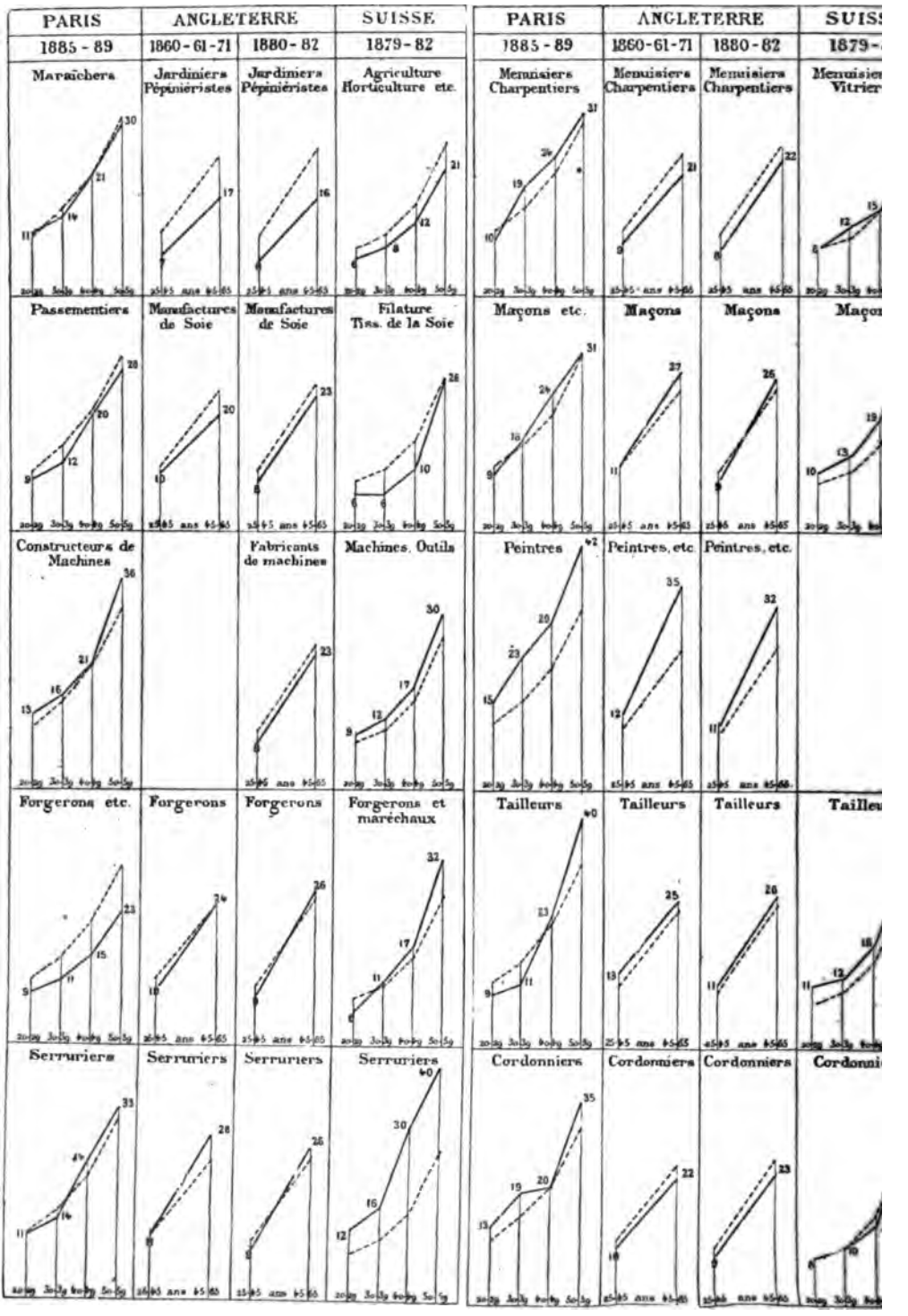
11.—Professions libérales.—En général, l'exercice de ces professions suppose une certaine aisance ; aussi sont-elles presque toutes soumises à une mortalité faible. Les *prêtres*, les *magistrats*, les *instituteurs publics* ont une mortalité des plus modérées. Les *avocats*, les *officiers ministériels* et leurs clercs, les *architectes*, les *ingénieurs* ont une mortalité inférieure à la moyenne. Les *médecins* de Paris ont une mortalité très faible, tandis qu'en Suisse et en Angleterre leur mortalité dépasse la moyenne.

Le table de mortalité par profession que nous avons calculée d'après les documents parisiens, et qui est la première qui ait été faite en France, ne peut être acceptée qu'avec réserve, étant soumise, comme les autres tables de mortalité, à de notables chances d'erreur. Cette table confirme presque en tous points les résultats obtenus d'après les documents anglais et suisse.

Mortalité par professions et par grands groupes d'âges comparée à Paris, en Angleterre, et en Suisse.

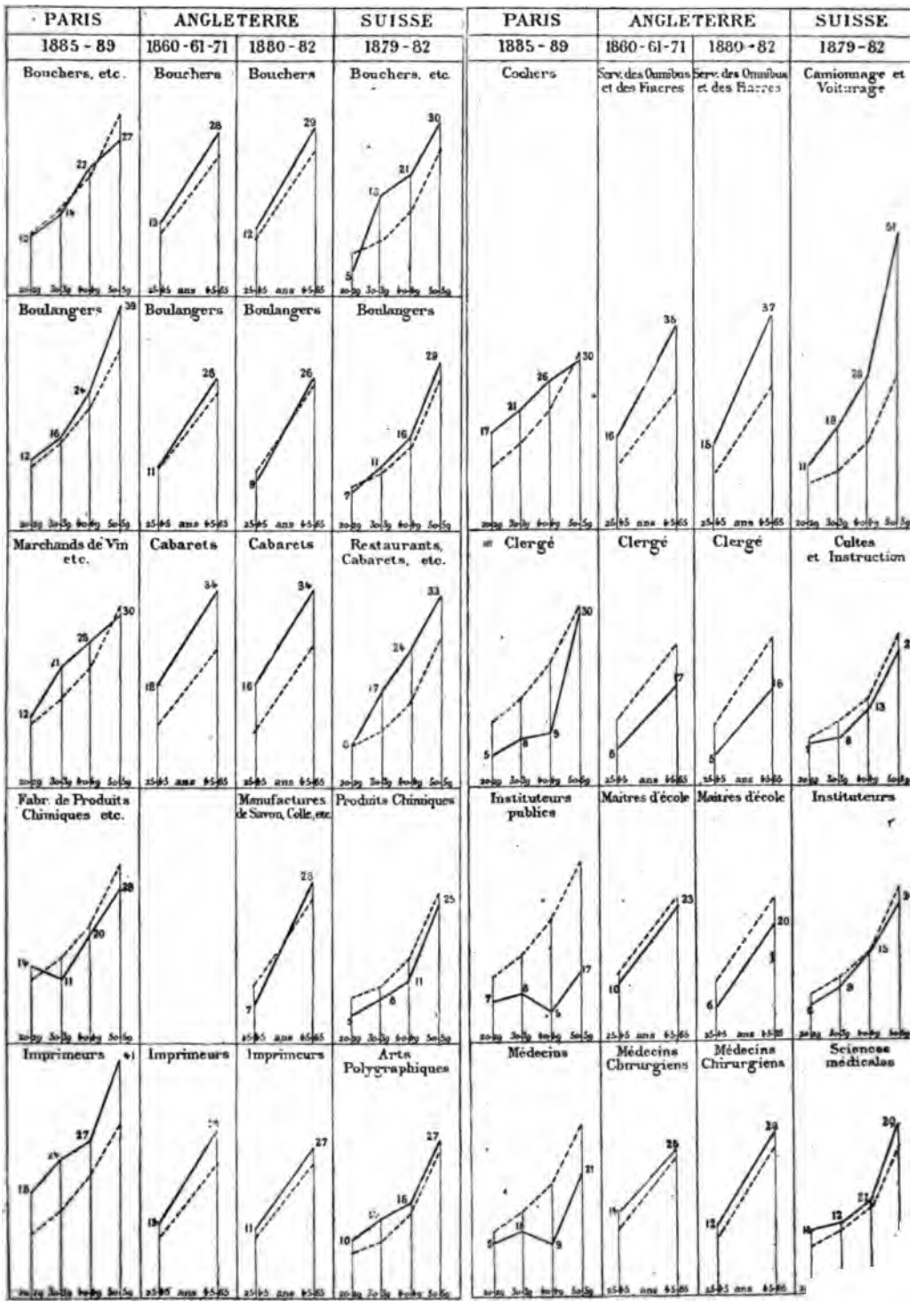
MORTALITÉ PAR PROFESSIONS ET PAR GRANDS GROUPES D

Les chiffres marqués sur chaque graphique expriment le nombre annuel des décès pour 1000 individu
graphiquement par un trait plein ——— qui représente la mortalité de chaque prof



COMPARÉE À PARIS, EN ANGLETERRE, ET EN SUISSE.

profession et de l'âge indiqués (l'âge est indiqué au pied de chaque ordonnée). Ces chiffres sont traduits
Le trait pointillé - - - - - - représente la mortalité moyenne de la population totale.



Sur 1,000 Individus du Sexe Masculin de chaque Âge et de chaque Profession, combien de Décès en un An? Paris 1885–1889.

Nos. d'Ordre.	Numéros correspondants de la nomenclature du Recensement de Paris en 1886.	Professions.	20 à 29 Ans.	30 à 39 Ans.	40 à 49 Ans.	50 à 59 Ans.
		Population totale de Paris (sexe masculin)	11.1	14.9	21.2	31.
1	3	Horticulteurs, pépiniéristes, maraîchers	11.1	13.6	21.6	
2	10, 11, 166	Tissus mélangés, passementerie, dentelles, tulles, blondes, marchands de passementerie, mercerie, dentelles, ganterie, lingerie.	9.1	12.2	20.4	
3	20	Machines de toute espèce; moteurs à vapeur fixes et mobiles; rails, coussinets, fers forgés et ouvrés pour construction; essieux, bandes de roues, appareils de chauffage et de ventilation; ustensiles aratoires; pièces d'architecture, en fonte, fer zinc, clous, vis, limes, épingles, aiguilles, fils télégraphiques, etc., etc.	12.7	16.2	21.2	36.0
4	21, 22, 23, 25, 162	Fondeurs, fourbisseurs, taillandiers, chaudronniers, forgerons, potiers d'étain, tourneurs sur métaux, coutellerie, objets de quincaillerie, marchands d'ustensiles de ménage, quincaillerie, bazars.	9.4	11.4	15.4	22.6
5	26	Tanneurs, corroyeurs, hongroyeurs, mégissiers, chamoiseurs, parcheminiers, maroquiniers, portefeuillistes.	9.1	10.5	15.9	26.4
6	29	Boisseliers, tonneliers, tamisiers, vanniers, layetiers et coffretiers.	10.9	14.3	17.7	26.1
7	36, 37, 41, 42, 43, 44, 45	Fabriques de produits chimiques servant dans les arts et pour la médecine (acides divers, soude, alun, potasse); fabriques de noir animal, de vernis et cirage, colle, garance, couleurs, graisse pour voitures, huile de poisson; fabriques de savon; féculeries et amidonneries; toiles cirées; caoutchouc; gutta-percha; raffineries, bitume, asphalte, soufre, résine, goudron.	13.6	11.3	19.8	27.6
8	51	Serruriers	10.9	14.2	23.8	32.9
9	52	Menuisiers et charpentiers	10.5	18.8	24.3	30.7
10	53	Maçons, tailleurs de pierre et couvreurs	9.5	16.0	23.7	31.4
11	58, 59	Marbriers, ornemanistes (mouleurs, praticiens sculpteurs).	20.1	21.2	23.4	39.0
12	55	Peintres, vitriers, plâtriers, décorateurs, badigeonneurs, doreurs en bâtiments.	14.8	23.0	28.8	42.0
13	56	Rampistes, plombiers, plafonneurs, parqueteurs.	15.0	22.3	25.2	44.1
14	67	Ébénistes, fabricants de meubles et chaises, marqueteurs.	9.0	13.6	16.3	24.5
15	68, 69, 160	Fabriques de tapis, tapissiers, marchands de meubles, tapis, rideaux, literie.	6.7	10.6	14.5	22.7
16	73, 74, 169	Chapeliers et fabricants de casquettes, fabriques de chapeaux de paille, marchands de chapeaux.	5.9	8.3	15.9	23.6
17	75, 167	Tailleurs, vêtements tout faits d'hommes et de femmes.	9.1	11.3	23.4	39·8
18	88	Cordonniers et bottiers	13.4	19.2	20.4	35.3

Nos. d'Ordre.	Numéros correspondants de la nomenclature du Recensement de Paris en 1886.	Professions.	20 à 29 Ans.	30 à 39 Ans.	40 à 49 Ans.	50 à 59 Ans.
19	29	Barbiers, coiffeurs et perruquiers	14.8	14.2	18.1	33.2
20	97	Raffineurs de sucre	7.1	13.7	18.4	24.6
21	99	Boulangers	12.4	16.2	24.4	39.0
22	158	Marchands bouchers, charcutiers, tripiers	10.6	14.0	22.2	27.5
23	155	Marchands de beurres, d'œufs, de lait, fromage, poisson, volaille, fruits et légumes.	5.7	9.9	11.8	17.4
24	154	Epiciers, pâtes alimentaires	6.6	7.0	8.7	11.4
25	104	Confiseurs, glaciers, chocolatiers	15·0	16.5	20.4	25.0
26	150, 151, 152 153	Marchands de vins et liqueurs, cafetiers, restaurants, rotisseurs, hôtels garnis.	12.0	21.2	25.7	30.2
27	113	Carrossiers, charrons, selliers, bourreliers, maréchaux-ferrants.	15.9	20.1	25.9	43.8
28	116	Imprimerie, lithographie, gravure en taille-douce, clichage.	17.8	23.7	26·7	40.6
29	119	Relieurs	11.9	14.1	13.2	27.4
30	126, 180	Orfèvres, bijoutiers, joailliers, lapidaires, émailleurs, horlogers, batteurs d'or, doreurs et argenteurs sur bois et sur métaux, fabricants de bronze, ciseleurs sur métaux; marchands d'orfèvrerie, bijoutiers, horlogers, objets en bronze.	9.7	14.0	14.9	24·7
31	140	Voituriers et charretiers	17.6	21.5	26.7	30.4
32	141	Directeurs et administrateurs, agents et employés des entreprises de voitures publiques (diligences, omnibus, fiacres, voitures de roulage, voitures de déménagement), loueurs de chevaux et voitures.	16.4	20.5	32.0	58.0
33	144, 145	Postes, télégraphes	5.7	7.8	10.5	19.3
34	146, 147, 148, 149, 186	Directeurs, employés, agents, gagistes, et salariés des établissements de crédit en société anonyme (Banque de France, Comptoir d'escompte, Crédit foncier, etc.); compagnies diverses d'assurances (directeurs, employés, gagistes); banquiers, changeurs, agents de change; courtiers de commerce, commissaires-priseurs, commissionnaires en marchandises, facteurs aux halles et marchés; négociants et employés sans autre désignation.	17.5	20.3	28.1	30.7
35	165	Commerce de nouveautés, bonneterie	14.8	25.5	40.4	49.4
36	195, 196	Clergé séculier (archevêques, évêques, chanoines, curés, vicaires, desservants, chapelains, aumôniers,); clergé régulier (religieux appartenant à des congrégations ou ordres religieux).	5.0	8.2	9.0	30.5
37	200	Avocats ou agréés près les tribunaux de commerce.	9.8	11.6	11.1	22.8
38	201	Officiers ministériels (avoués, notaires, huissiers et leurs clercs).	10.3	15.8	22.4	42.2
39	204	Médecins et chirurgiens	9.9	11.3	9.8	21.9
40	205	Pharmaciens et herboristes	7.8	9.2	11.1	15.7

Nos. d'Ordre.	Numéros correspondants de la nomenclature du Recensement de Paris en 1886.	Professions.	20 à 29 Ans.	30 à 39 Ans.	40 à 49 Ans.	50 à 59 Ans.
41	212	Directeurs, professeurs, régents, maîtres et économes des établissements d'instruction entretenus aux frais de l'État, des départements, des communes (écoles, primaires, lycées, facultés, écoles spéciales).	7.0	8.5	5.8	17.0
42	215	Professeurs spéciaux (musique, danse, dessin, escrime, etc.).	19.4	11.8	17.0	55.8
43	216	Architectes - - - - -	3.6	5.2	17.0	25.8
		Population totale de Paris (sexe masculin)	11·1	14.9	21.2	31.2

De la Mortalité des Mineurs, des Armuriers, et des Passementiers, à St. Étienne, 1880–1889.

PAR

le Docteur C. M. Fleury, Directeur du Bureau municipal d'Hygiène, St. Etienne.

Les trois professions ci-dessus indiquées comprennent une grande partie de la population ouvrière de Saint-Étienne; à ce titre il était intéressant de rechercher l'influence qu'elles pouvaient exercer sur la mortalité, sur le genre de maladies, et sur la durée de la vie. Les trois tableaux qui accompagnent cette note résument les diverses données qui m'ont été fournies par la statistique sur ces questions.

Sous la dénomination de mineurs ne sont compris que les ouvriers occupés dans les mines de houille; sous celle d'armuriers figurent ceux qui travaillent soit pour le fusil, soit pour l'arme blanche; et enfin la classe des passementiers englobe les veloutiers, les rubaniers et les travailleurs qui fabriquent la passementerie proprement dite. Pour ces derniers la distinction en catégories spéciales est impossible, l'état civil ne les établissant pas et leur affectation à tel ou tel métier variant parfois suivant la mode.

Le premier tableau fournit le nombre absolu des décès suivant les âges et les principales causes pendant la période décennale 1880–1889.

Pour les mineurs ce sont les affections des voies respiratoires qui occasionnent la plus grande mortalité, en faut que maladies; viennent ensuite les affections du cœur. La bronchité chronique, l'emphysème et à la suite la délatation des cavités droites du cœur constituent un processus commun chez ces ouvriers; l'encombrement des poumons par les poussières charbonneuses en est le facteur principal.

Mais au dessus des décès par maladies, il faut placer ceux qui surviennent à la suite d'accidents; ils entrent pour plus du tiers (440) dans le total. Ce chiffre est élevé par suite de deux catastrophes ou explosions de grisou qui ont fait un grand nombre de victimes et qui se trouvent comprises dans cette période. Les accidents isolés représentent néanmoins à eux seuls un taux encore trop considérable.

On peut voir en revanche que le phtisie pulmonaire est plus rare chez le mineur que dans les autres professions que nous étudions.

Les armuriers sont au contraire très exposés à devenir phtisiques, et c'est la maladie qui chez eux prélève le tribut le plus lourd.

Là encore les poussières jouent un rôle nuisible et la sidérose ou présence de particules métalliques ou minérales dans les bronches occasionne un traumatisme qui ouvre la porte au bacille. La bronchite chronique occupe le second rang.

Enfin les passementiers fournissent également un nombre élevé de décès par phtisie, mais tandis que chez les armuriers elle entre pour

Tableau I.

Armuriers, et Passementiers pendant les Dix Années 1880–89.

E.											F.						G.			H.			I.							
Bronchite aig.	Bronchite chr.	Cong. pulm.	Emphysé.	Gang. poum.	Pleurésie.	Pneumonie.	Broncho-pn.	Asthme.	Autres.	Anthracosis.	Diarrhée.	Dysentérie.	Hernie.	Obstruction.	Péritonite.	Autres.	Cirrhose.	Ictère.	Autres.	Cystite.	Néphrite.	Autres.	Phlegmons.	M. des Os.	Tumeurs.	Autres.	Sénilité.	Morts. subites, causes incon.	Suicides.	Accidents.	Totaux.
–	1	–	–	–	–	–	3	–	–	–	1	–	–	–	–	–	–	–	–	–	1	–	–	1	–	–	–	1	–	24	48
4	1	–	–	–	–	–	3	–	–	1	–	–	1	–	–	–	–	–	–	–	2	–	–	–	–	–	–	1	2	51	94
–	–	–	–	–	–	–	3	–	–	–	1	–	1	–	–	–	–	–	1	1	2	–	1	1	–	3	–	1	1	54	91
2	1	–	–	–	–	–	4	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–	2	–	3	3	56	98
2	1	–	1	–	1	8	1	–	2	–	1	2	–	–	–	–	1	2	–	1	4	1	–	–	–	–	–	3	3	74	139
11	21	–	3	1	3	31	6	–	1	–	1	–	–	1	–	–	2	1	–	–	9	–	2	–	3	2	–	1	7	78	264
20	32	2	16	–	1	28	3	2	1	5	4	2	2	–	1	2	3	2	–	–	1	2	1	1	1	–	–	5	4	39	261
10	45	3	12	–	3	18	9	3	–	5	4	–	5	1	–	3	2	–	1	–	3	1	–	–	–	1	–	–	1	15	204
5	21	–	2	–	–	11	–	–	–	–	1	–	1	–	1	1	1	–	–	1	2	2	–	–	–	2	14	1	1	–	96
54	123	5	34	1	8	111	19	5	5	10	14	4	11	2	2	6	9	5	2	3	25	6	4	3	4	10	14	13	22	391	1,295
						375							39					16			34				21			440			1295
–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	–	24
–	–	–	–	–	–	2	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	27
1	3	–	–	–	–	4	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	2	–	48
1	8	–	2	–	–	3	1	–	–	–	–	–	–	1	2	2	–	–	1	–	–	–	–	–	–	–	–	–	2	–	77
1	5	1	1	–	3	8	1	–	1	2	–	–	–	1	1	2	2	1	1	–	1	–	–	–	–	–	–	–	9	3	98
1	17	1	1	–	3	12	1	–	2	–	3	1	1	1	–	1	3	–	–	1	2	–	–	–	1	–	–	–	7	1	147
1	19	1	1	–	1	15	2	–	1	–	2	1	2	–	–	1	2	–	–	2	2	1	–	1	1	–	–	–	3	3	130
2	21	–	1	–	–	13	6	–	1	–	2	–	–	2	–	–	3	–	3	–	1	–	–	1	1	–	–	2	2	1	121
1	16	3	–	–	1	9	1	–	2	–	2	–	–	1	–	–	1	–	–	2	1	3	1	–	–	–	8	3	2	–	120
8	91	6	6	–	8	66	12	–	8	2	10	2	5	4	3	8	11	1	5	5	7	4	1	2	3	–	8	5	28	8	792
						207							32					17			16				6			49			792
1	–	–	–	–	1	2	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	1	–	–	–	–	–	2	–	36
–	2	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	–	–	22
–	1	1	–	–	1	3	–	–	–	–	1	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	35
–	1	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	2	1	–	33
–	5	–	–	–	–	7	1	1	–	–	–	–	–	1	–	1	–	–	–	–	2	–	–	1	–	–	–	–	7	1	54
1	19	1	1	–	2	14	3	1	–	–	2	–	2	1	–	7	3	–	1	–	2	1	–	–	1	–	–	2	6	2	168
10	24	1	6	2	6	26	2	–	–	–	1	–	–	–	–	–	6	1	2	2	7	1	2	–	–	–	–	3	19	6	302
6	29	3	5	–	1	30	3	1	–	–	2	3	2	–	2	2	8	–	–	–	4	–	–	1	1	–	3	4	5	1	261
3	12	–	6	1	1	22	7	1	–	–	4	1	1	–	–	5	1	–	1	5	5	4	2	–	–	2	28	3	1	1	209
21	93	6	18	3	13	106	16	4	–	–	10	4	6	3	3	16	18	1	4	7	22	6	5	2	3	2	31	15	41	11	1120
						280							42					23			35				12			98			1120

26 °/₀ dans le chiffre total, chez eux la proportion descend à 14·30 °/₀; elle est de 9·75 seulement chez les mineurs. (Tableau II.)

TABLEAU II.

MORTALITÉ comparée des MINEURS en PASSEMENTIERS et Age moyen pour les principales causes de Décès.

Moyennes observées pendant les dix années 1880 à 1889, abstraction faite des morts violentes.

Causes des Décès.		Proportion.	Mineurs.	Armuriers.	Passementiers.
B. 24.	Cancer - -	Nombre pour 100	5·78	6·88	9·30
		Age moyen -	53 ans 0 mois.	58 ans 6 mois	59 ans 2 mois
B. 36.	Tuberculose pulre.	Nombre pour 100	9·75	26·46	14·50
		Age moyen -	38 ans 11 mois.	36 ans 11 mois	42 ans 7 mois
C. 40.	Congestion cérébrale.	Nombre pour 100	4·65	5·95	9·90
		Age moyen -	56 ans 1 mois	65 ans 0 mois	61 ans 6 mois
D. 56.	Affections du coeur	Nombre pour 100	10·54	10·06	9·30
		Age moyen -	62 ans 4 mois	57 ans 10 mois	65 ans 3 mois
E. 60.	Bronchite aigue.	Nombre pour 100	6·12	1·06	1·90
		Age moyen -	52 ans 5 mois	52 ans 0 mois	58 ans 1 mois
E. 61.	Bronchite chronique.	Nombre pour 100	13·95	12·06	8·30
		Age moyen -	58 ans 6 mois	54 ans 7 mois	56 ans 6 mois
E. 63.	Emphysème pulre.	Nombre pour 100	3·85	0·79	1·60
		Age moyen -	57 ans 8 mois	42 ans 2 mois	61 ans 10 mois
E. 66.	Pneumonie - -	Nombre pour 100	12·59	8·73	9·50
		Age moyen -	50 ans 11 mois	50 ans 0 mois.	57 ans 10 mois
E. 66 bis.	Broncho-pneumonie.	Nombre pour 100	2·16	1·59	1·50
		Age moyen -	54 ans 7 mois	56 ans 1 mois	62 ans 1 mois
F. 72.	Diarrhée - -	Nombre pour 100	1·59	1·32	0·90
		Age moyen -	47 ans 4 mois.	59 ans 0 mois	60 ans 3 mois
F. 81.	Autres affons. tube digestif.	Nombre pour 100	0·68	1·06	1·50
		Age moyen -	62 ans 0 mois.	37 ans 10 mois	53 ans 8 mois
G. 84.	Cirrhose - -	Nombre pour 100	1·02	1·45	1·60
		Age moyen -	52 ans 1 mois	53 ans 3 mois	58 ans 5 mois
Age moyen général (abstraction faite des accidents et des suicides).			51 ans 9 mois	49 ans 3 mois	56 ans 5 mois

Il faut noter encore chez les passementiers la fréquence de la congestion cérébrale et du cancer de l'estomac ; j'ai expliqué antérieurement cette particularité par la position qu'ils prennent durant leur travail. (*De la Déformation thoracique des Passementiers*, en collaboration avec le Dr. Reynaud.) Ils passent en effet un temps assez long courbés et appuyés au niveau du sternum sur la barre de leur métier ; de là gène de la circulation et refoulement de l'oundée sanguine vers le cerveau. La compression prolongée du sternum et de l'estomac déprime le sternum, et je me suis demandé si les dyspepsies et le cancer de l'estomac observés chez ces ouvriers n'étaient point dût à l'irritation répétée de cet organe qui amènerait à un moment donné soit un processus néoplastique, soit de simples troubles digestifs.

Tableaux III.

Mortalité comparée des Mineurs, Armuriers, et Passementiers à partir de l'Age de 15 ans.
Moyennes observées pendant les années 1880–90.

Causes des Décès.	Répartition de 100 Décès suivant les Catégories de maladies				Ages moyens des décédés par Catégories de maladies.		
	Mineurs.		Armuriers.	Passementier.	Mineurs.	Armuriers.	Passementiers.
	Y compris les morts violentes.	Non compris les morts violentes.					
					Ans. Mois.	Ans. Mois.	Ans. Mois.
A.—Maladies épdémiques et transmissible.	3·10	4·31	3·79	2·05	25 10	39 3	33 11
B.—Maladies générales	11·20	18·14	34·47	25·62	47 4	43 6	49 10
C.—Maladies du système nerveux.	5·50	7·94	9·22	15·89	55 5	60 4	60 10
D.—Maladies de l'appareil circulatoire.	7·80	11·56	11·24	12·68	52 2	53 3	58 2
E.—Maladies de l'appareil respiratoire.	29·00	42·52	26·13	25·00	55 10	54 9	58 5
F.—Maladies du tube digestif.	3·20	4·43	4·04	3·75	50 3	45 8	54 5
G.—Maladies du Foie et de la Rate.	1·20	1·81	2·14	2·05	58 10	57 10	57 4
H.—Maladies de l'appareil génito-urinaire.	2·50	3·85	2·02	3·13	45 10	55 8	61 6
I.—Maladies dites chirurgicales.	1·30	2·38	2·76	1·07	42 4	51 10	53 10
Senilité	1·00	1·59	1·01	2·77	80 4	80 4	79 5
Suicides	1·70	—	3·54	3·67	43 5	49 11	51 2
Accidents	31·00	—	1·01	3·98	35 4	39 9	54 1
Causes indéterminées.	1·50	1·47	1·63	1·34	38 7	44 8	59 7
	100·00				Ans. Jours 45 15	Ans. Mois 49 3	Ans. Mois 56 6
		100·00	100·00	100·00	Ans. Mois. *51 9		

* Accidents deduits.

Le tableau III. résume une partie des données précédentes et donne en outre l'âge moyen des décédés par catégories de maladies et par professions. On arrive à cette conclusion; c'est que les passementiers vivent le plus longtemps (56 ans et 6 mois); viennent ensuite les armuriers, 49 ans et 3 mois; et enfin les mineurs, 45 ans et 15 jours; si de la mortalité de ces derniers ou déduirait les accidents qui sont très fréquents chez eux, la durée de leur vie remonterait à 51 ans et 9 mois.

Espérons que les progrès de la science permettront de triompher du grisou, le principal ennemi du travailleur souterrain.

Les statistiques qui précèdent concordent absolument avec celles du Dr. Ogle, et cette concordance même de chiffres relevés dans des pays différents nous est un garant précieux de leur authenticité; leur signification en est rehaussée, et l'hygiéniste aussi bien que l'administrateur et le législateur ne pourront hésiter à rechercher et à imposer les mesures préventives.

DISCUSSION.

Dr. Milliet (Berne) said: I speak as a sceptic, and I congratulate Dr. Ogle and Dr. Bertillon on being the same. I wish to point out how difficult it is to draw conclusions, how complicated often are cause and effect. Dr. Ogle shows us that in this country brewers and innkeepers have a high mortality rate. In Switzerland and in the United States of America brewers have a low rate of mortality. I should suppose that this is partly due to the fact that the brewing industry requires in itself and from the beginning a staff of strong and healthy men.

Innkeepers' mortality is also high in Switzerland. But as to this occupation, it is very difficult, at least with us, to ascertain the professional risk. Firstly, there are two classes of innkeepers, "solid" and "accidental." With the solid innkeeper the conducting of a public-house is a "labour business." The accidental innkeeper has, perhaps, passed through three or four other trades or industries before he became a holder of a public-house. These accidental innkeepers often enter their final occupation with broken health. On the other hand, innkeeping is often connected with other occupations. In the country places and market towns of Switzerland, inns are kept by butchers, bakers, or agriculturalists. The principal occupation of an innkeeper of this kind may be the cultivation of the soil. But at the Census he returns himself as an innkeeper, because this word sounds better. His mortality is represented as a fraction of the innkeepers' mortality, though it really belongs rather to the mortality of agriculturalists.

Dr. Ogle gives us a low death-rate for the coal miners. May there, as to this class of working men, not be similar influences as to the class of innkeeper, but in an inverse sense, people being at the pit as long as they are young, and passing over to other occupations when they are getting to riper ages?

Another example showing the difficulty of finding the exact mortality-rate of special professions is furnished by the Swiss guide.

I should like to point out that statistics probably always will be but a crude method of ascertaining facts, and that it therefore is of real practical advantage to be as scientifically modest in conclusions as have been our learned colleagues Dr. Ogle and Dr. Bertillon.

Dr. Vaillant (Paris) dit: — Dans son si intéresant rapport le Dr. Ogle nous a donné comme une des sept principales causes de maladie et de décès prématuré de l'ouvrier l'excès de travail. Je crois pour ma part que ce n'est pas seulement une des sept causes donnés, à la quelle il faudrait en tout cas assigner le premier rang, mais aussi un élément capital dans la production des autres causes. Aussi ai-je demandé la parole non seulement pour démontrer que la réduction du travail quotidien dans son intensité et sa durée est commandée non moins par l'hygiène individuelle et sociale que par les raisons économiques et émancipataires qui animent la classe ouvrière; j'ai demandé la parole surtout pour que le Congrès au nom de l'hygiène publique donne son approbation au mouvement ouvrier des huit heures (eight hours' day).

Le Dr. Bertillon nous disait tout à l'heure qu'il est impossible de déterminer en chaque cas individuel où commence la maladie ou même s'il y a maladie. Cela peut être vrai pour le statisticien mais non

pour le médecin. Il faut en effet considérer que la maladie se détermine par trois facteurs, dont l'un est la complexité de causes qui constitue l'invasion morbide, l'autre le milieu et enfin le troisième la receptivité à la résistance de l'individu. C'est le rapport entre ces trois facteurs relativement variables qui détermine s'il y aura maladie. Si l'hygiène commande de tout faire pour prévenir la naissance et le transfert de la cause morbide de lui soustaire tout vehicule, d'éviter que ces germes et qu'elle même trouve un milieu de culture et de développement elle ne commande pas moins de diminuer la receptivité individuelle de porter au sommaires dans l'intérêt général et particulier la résistance de l'individu. Ce même individu que l'excès du travail et le défaut de réparation des forces met dans cet état de misère physiologique qui l'expose à succomber individuellement à la moindre attaque morbide et à devenir en cas de maladie infectieuse un agent d'infection générale, eut échappé souvent à ces influences morbides si son organisme avait eu une force de résistance supéricure. Pour assurer et développer cette force de résistance il n'y a pas de moyen plus efficae que la limitation du travail quotidien de l'ouvrier à la fois dans son intensité et sa durée.

L'effet de cette limitation est à la fois physique et moral l'ouvrier qui a un temps de repos suffisant au quel correspond par la limitation du chomage qui résulte et fait que le travail général est accompli par l'ensemble des ouvriers au lieu d'une partie qui aujourd'hui est seulement occupée, l'ouvrier qui a un repos suffisant pour renouveler entièrement chaque jour ses forces peut non seulement continuer sa vie et son travail sans user anomalement son organisme et diminuer sa force de résistance mais il peut aussi avoir entretenir élever une famille resentants, avoir une existence familiale et civique. Son niveau moral et intellectuel s'élève en même temps que son état matériel, et celui de sa famille.

Il devient un membre conscient de sa classe, travaillant à son organisation et émancipation ; il réclame la salubrité du milieu et de l'industrie où il travaille et comme condition essentielle de son bien-être, il réclame surtout la limitation de la durée du travail avec la faculté de ménager et réparer ses forces, pour une vie normale dans son cours et sa durée.

Je rappelle que toutes les causes de maladie énumerée par le Dr. Ogle seraient affectées par cette réduction du travail. Aussi dans la question de l'alcool traitée par M. Milliet où il a si bien montré les illusions de la statistique actuelle il est certain que l'abus et les dangers de l'alcool seraient surtout efficacement combattus par la réduction de la durée de travail. Quand l'organisme est épuisé par l'excès de travail, est mal nourri il recherche inévitablement des stimulants de préférence aux aliments. Il éprouvé là une satisfaction immédiate qui l'entraine de plus en plus à l'habitude alcoolique.

Il se trouve dans un cas semblable à celui du malade qui dans une fièvre typhoïde, par exemple, trouve, par un stimulant alcoolique, le moyen de rassembler ses forces pour traverser le moment critique d'une dépression ménaçante. Mais le résultat est tout autre ; et cet organisme de plus en plus stimulé de moins en moins alimenté bientôt, succombe. Si au contraire à un travail quotitien répondait un repos quotidien et une alimentation quotitienne suffisants, le stimulant ne serait plus un besoin, ne serait plus même un objet de désir. Enfin pressé par

le temps, je conclus, en indiquant comment il me paraît du devoir du Congrès qui a établi l'ordre du jour que discutent les diverses sections, de prendre à propos du sujet traité par le Dr. Ogle une résolution pour la limitation du travail.

L'objet principal du Congrès est la protection de la santé publique contre la maladie en général et tout particulièrement cette fois contre l'invasion des maladies infectieuses surtout du choléra. A cet effet on se propose là où s'est possible d'éteindre le foyer même de production des germes infectieux, en tout cas d'en arrêter la propagation et détruire au passage les germes, afin qu'il ne puissent être transporté. Si le germe infectieux a franchi la barrière qu'on lui oppose, il faut que le milieu où il arrive soit assaini pour qu'il ne puisse s'y développer, il faut que la classe ouvrière par son bien être par sa résistance augmentée ne soit pas sa proie première et comme predestinée. Toutes les classes sociales y ont un intérêt de premier ordre car ces malades prédestinés par la misère et de receptivité, augmentée ainsi deviennent les vehicules de la maladie dans les pays qu'on voulait protéger. Il y a ainsi dans la santé publique aussi une solidarité sociale qui oblige à des mesures qui paraissant spéciales pour une classe ont cependant leur effet général.

Au point: Je ferai enfin remarquer, ce qui est presque superflu dans le pays de Darwin et ici après l'adresse de notre Président que ce qui est fait pour l'individu dont on relève la force physique et intellectuelle est fait aussi par la race menacée de plus en plus de déchéance par l'excès de travail et de misère que nous pouvons diminuer en répartissant sur tous le travail limité par une loi internationale.

En conclusion, je propose donc au Congrès de prendre la résolution suivante en faisant seulement remarquer que la limitation de la durée du travail n'aura d'effet réel pour la diminution du chomage et pour obtenir les avantages individuels, et nivaux qu'en attendant les travailleurs qu'à la condition que le travail à la journée soit seul appliqué et que le patronat ne puisse compenser par une intensité accrue, la durée diminuée. Enfin si une loi internationale limitant à huit heures au nom de l'hygiène aussi bien qu'économique le travail quotidien; chaque pays peut, d'autant plus il est avancé en civilisation et industrie, réduire encore d'avantage cette durée au grand avantage de la santé publique. Le Congrès dirait seulement par la résolution que je propose qu'il approuve les réformes demandées et faites dans cette direction.

Dr. Körösi (Budapest), said that as his investigations were, for the greater part, published in Hungarian, he begged to be allowed to communicate briefly the results of 18 years' observations. He had observed at Budapest the frequency of 16 causes of death amongst 50 male and 11 female occupations. The latter are also grouped with regard to the nature of the labour, into such people as work—*mentally*, with *physical power*, in a *sitting* or in an *upright* posture, in great *heat*, in *dust*, in a *confined* space, or in the open air.*

Old age is the most frequent cause of death amongst those engaged in mental occupations, but also exists amongst those working physically, probably as a result of the before-mentioned selective power of these occupations. Amongst people working in a confined space, and even in the open air, old age is very seldom, but consumption is frequently, the cause of death. This may be explained by the fact that there the

* *Vide* Körösi, Hestlichkeit in Budapest, 1885, page 247–255.

relation between cause and effect may be, perhaps, inverted, as those who are weak must prefer sedentary occupations. As for the class working in the open air, we must take into consideration that in urban populations, with which I have to deal, there are comprised no agriculturists and gardeners, but bricklayers, carpenters, drivers, &c. I should also state that the dust medium — for Budapest, almost exclusively labour in flour-dust—exerts no influence upon consumption.

Dr. Ebenezer Duncan (Glasgow), said that he would confine his remarks to one class of workers referred to by Dr. Ogle, viz., plumbers. He had sent out circulars to the working plumbers of Glasgow to find out, 1st. to what extent they suffered from lead, and 2ndly, to what extent they suffered from such zymotic diseases as typhoid fever and diphtheria, which are commonly attributed to the inhalation of sewage gases. With regard to lead poisoning he found that plumbers suffered just as much as painters from this danger; the reason being that they were not only exposed to the fumes in lead smelting, but they had their hands constantly smeared with such poisonous lead compounds as the red oxide of lead, and that they did not wash their hands before taking their meals. They were, therefore, daily taking minute doses of this poisonous lead salt with their daily meals. This, of course, was a preventible cause, and could be obviated by greater attention to cleanliness and the use of a nail brush before meals.

With regard to such diseases as typhoid fever and diphtheria, he found that they did not suffer; there was practically no mortality among plumbers from these diseases. He found that of 164 plumbers who answered his inquiries, only one attributed one attack of typhoid fever to exposure to sewage gases, and no case of diphtheria was attributed to that cause. In corroboration of this, the superintendent of the city fever hospital in Glasgow told him that, in 1890, he had only treated one plumber for typhoid fever in that large hospital, and he had no plumber with diphtheria among his patients. The only disease of a contagious nature from which plumbers really did suffer to any extent was phthisis pulmonalis. No doubt, from the fact that the spitoons containing the sputa of patients suffering from phthisis pulmonalis were emptied into our water-closets and drains, there were constantly myriads of the specific organisms of tubercle circulating in our drains and sewers. If he were to reason on the ordinary methods of the sewer-gas sanitarian, he might easily prove that the plumbers must have got the contagion from sewage-gases, but he held that no specific organisms could be carried from moist sewage matters, or could be conveyed through moist pipes. The inquiries of Professor Haldane and of Dr. Haldane had shown that the air of well-ventilated sewers was chemically purer than the air of small houses and of most public schools, and that, as regards micro-organisms, the sewer-air contained fewer than the outside air, owing to the fact, first, that no solid particles ever arise in the process of evaporation from liquid matters, and secondly, that it is almost impossible to detach bacilli from moist surfaces. Then, again, the bacilli and other organisms carried in from the open air stick to these moist surfaces, and so the air, instead of becoming more infective in sewers, is less so. He had conducted inquiries as to several large epidemic outbreaks of typhoid fever, in which the epidemic was proven to have arisen from poisoned milk, and he had never found that in any of these epidemics (when quantities of the poisonous typhoid excreta were circulating in the sewers of Glasgow) was there any proof that the people

i p. 2596.

draining into these sewers had the disease carried back into their houses although, in many cases, there was, through defects, direct communication between the houses and the sewers. For these reasons he thought that it was necessary for sanitarians to revise the commonly received opinions as to the connexion between sewage-gases and the specific infectious diseases. In Dr. Duncan's opinion the sewer-gas demon is a bogus demon, so far as these diseases are concerned.

Dr. Arlidge (Stoke-upon-Trent), remarked on the importance of the subject, which he had made a special study for a series of years and had dealt with in the Milroy Lectures delivered before the Royal College of Physicians of London. He noticed the difficulties attaching to industrial statistics (1) from the looseness of description of occupation in health returns; (2), from the varieties of work included under a common name, as in the cotton and pottery manufactures, and, indeed, in all the chief employments of the country; (3), from the position of a manufacture, whether in town or country; (4), from other *accidental* conditions—lodging, wages, food, trade customs, and especially addiction to alcohol. As to deaths from lead, he called attention to the fact that death directly traceable to lead represents a very small proportion of those deaths to which lead has been contributory; and that as to urinary diseases from lead, his experience for years amongst a large number of sufferers from plumbism was that no albumuria is found, and this suggests an important question. He noticed that Dr. Ogle, in his notes of textile work, has omitted the linen manufacture, in which the evil consequences to health are very marked; and that, as regards stone workers, the injurious results vary remarkably according to the quality of the stone.

As to phthisis and respiratory diseases of coal miners, it seems made out that the former is far from prevalent. The latter are most frequent. He could not accept the hypothesis of some inherent property of coal dust antagonistic to tuberculosis. If coal, considered as a carbon, is the reason, the inhalation of the purer carbon of charcoal should be more so. There is no evidence that such is the case.

Professor Böhmert (Dresden), warnt vor allgemeinen Schlüssen in diesen wichtigen Frage der Lebensdauer der einzelnen Berufsstände und beweist aus den Enfahrungen der Statistix der Königreichs Sachsen, dass viele Personen in ihrem Berufe wechseln. Viele Personen, welche in Sachsen im Winter die Weberei, einen sehr gefährdeten Beruf treiben, beschäftigen sich im Sommer als Maurer oder Zimmerleute oder als ländliche Arbeiter. Die bisher angestellten Untersuchungen sind sehr werthvoll, aber sie müssen noch weit mehr als bisher auf einzelne Berufsstände in verschiedenen Ländern beschränkt werden, ferner müssen verschiedene Personen der Berufsstände einzeln beobachtet werden nach der Untersuchunger methode von Le Play. Wir müssen bedenken, dass sich den Spinnerei und Weberei von vorn herein meist nur von wächliche Personen zu wenden, während nur kräftige und gesunde Personen Schlossen und Schmiede werden. Ueberhaupt ist die Methode der statistischen Untersuchung in Betreff der Ermittlung der Lebensdauer der verschiedenen Berufsstände von grösste Wichtigkeit. Mit der Einzelforschungen können recht gut allgemeine Ermittlungen Hand in Hand gehen. Die Resultate der allgemeinen Ermittlungen führen uns allerdings rascher zum Ziele und geben uns namentlich werthvolle Winke zur Beurtheilung der Lage der arbeitenden Classen. Wir müssen namentlich den in ihren Gesundheit gefährdeten Classen

eine kürzere Arbeitszeit wunschen und bessere Vorkehrungen für die Gesundheit der dabei betheiligten Personen.

Dr. Bash (Reichenberg, Austria), weist darauf hin, dass der von M. Vaillant (Cannes) gestellte Antrag über die internationale Beschrankung des Arbeitstages eine über den Rahmen des eigentlichen Gegenstands der Verhandlung hinausgehende social-politische Bedeutung besizt, und empfiehlt im Hinblicke auf die geringen praktischen Erfolge, welche diesbezülich von der internationalen Arbeiterschutz-Conferenz in Berlin erzielt wurden, die Congress möge sich unbedingt auf solche Beschlusse beschränken welche Aussicht auf Durchführbarkeit haben.

Dr. Ogle briefly replied, stating that he was perfectly aware of the difficulties connected with occupational statistics, and could only claim that the best use possible had been made of all the statistics which were available.

Thrift in Great Britain.

BY

ROWLAND HAMILTON, F.S.S.

The subject of national thrift is one which cannot be passed over at this Congress without some brief notice.

I wish that someone with a far wider range of practical experience than myself could have been induced to bring it forward; for it is indeed one of such large dimensions, involving so many complex issues as yet under discussion, that it would be impossible to do justice to it in any single paper, or indeed in any single congress. I can only attempt to present a few leading features in general outline, and endeavour to show how they stand in relation to each other.

The methods attempted or adopted, especially during recent times, have been very many and various, and comprise some of very old standing, which have been largely developed—not without conflict—side by side with those of more recent origin, and those also which still cling to more simple and primitive traditions of action. There is thus much overlapping in the work taken up by various agencies, but against this apparent loss there is a substantial gain in the well tested experience which is accumulated. Exact statistics are only partially available, and may be misleading if not rightly understood. From some quarters full returns are made, while from others, which from a social point of view are of equal importance, only very vague information can as yet be obtained, but the seeds of further progress are to be found in the latter as well as in the former, and we look forward to the gradual co-ordination of all those expedients which are found to serve best the end in view. Still much useful light is thrown on the more organised movements by the statistics afforded, though they do not give any adequate measure of the aggregate of work done or in progress.

The customs and habits of this country, though differing in many respects in different localities, have ever been strongly in favour of spontaneous action in all matters affecting our social life. Our aim, in the main, is not to extend the departmental functions of Government to the details of social administration, but rather to reserve to it only those powers which are required to bring individual efforts into practical harmony, and to adapt the laws of the land to meet the new exigencies arising in our social organisation; or, at most, to assume those duties only which are of so general a character that they can be best carried out from one common centre.

It is not alleged that even these broad principles are universally accepted, or that their application does not often call for patient forethought, which may be decried as an undue toleration of shortcomings, or even of abuses, which apparently admit of more speedy remedies; but we do trust largely to the teachings of experience, carried home to those most nearly concerned, for the development of a system more fully adequate to our needs, and to the growth of a state of public feeling in which the ideal of *subordination* shall become more and more merged in that of *co-ordination*, and of the co-operation of services rendered in so many various ways for the common welfare of all. And this International Congress brings home to us most fully that the problem is one in which all civilised countries are vitally concerned, and we welcome most cordially the experiences which our neighbours and guests can bring to bear upon it.

It will be convenient to begin with some reference to savings banks, which appear to have been introduced into several countries in Europe during the latter part of the 18th century.

Here, in 1860, the amount invested (with the Commissioners of the National Debt) was over 41,000,000*l.*, owned by over 1½ millions of depositors in the United Kingdom, at rates of interest varying from 4*l.* 11*s.* 3*d.* to 3*l.* 5*s.*, &c. In the latter part of 1861 the facilities afforded by the machinery of the Post Office were laid open to the public, and by the end of the following year 2,535 offices were open, and 1,698,000*l.*, including interest, had accumulated. By the end of 1889 a total of over 4½ millions of depositors' accounts was shown, in all nearly 63,000,000*l.*, including 1,443,000*l.* for interest. The deposits for that year only were 18,814,000*l.* in 9,385 offices on 4,508,000 accounts. Of these fully 92 per cent. were in England and Wales, and the average due on each account was 13*l.* 9*s.* 5*d.* The withdrawals during the same period were 16,814,000*l.*, to which reference is made hereafter.

The interest allowed is at the rate of 2½ per cent., or one halfpenny per 20*s.* per calendar month. Ordinary deposits are received from 1*s.* upwards, not exceeding 30*l.* in any one year, or 150*l.* in all, exclusive of interest, until a final total of 200*l.* is reached.

But this restriction does not apply to a duly registered Friendly Society acting through its trustees, from whom deposits are received without limit, or to a charitable or provident society, "penny bank," or similar institution, which may make deposits to the extent of 100*l.*

in any one year, or 300*l.* on the whole, or, (with consent of the Commissioners of the National Debt), without limit.

Purchases of Government stocks can also be made through these banks in amounts from 1*s.* up to 100*l.* in any one year, or 300*l.* in all, irrespective of the limit for money deposits. During the same year (1889) 1,003,000*l.* was bought and 605,000*l.* sold, the total amount remaining being 4,176,000*l.* for 47,000 investors, or an average of 88*l.* 17*s.* 1*d.* each, the interest credited to the accounts being 171,000*l.*

Immediate or deferred life annuities may also be bought for not less than 1*l.* or more than 100*l.* on the life of any person over 5 years of age, or for life insurance for 5*l.* to 100*l.* at the ages of 14 to 65 years, the lives of children between 8 and 14 years of age may be insured for 5*l.* only. The beneficiaries have the direct security of Government for the due payment of their claims. The last report shows the amount of then existing annuities to be 229,000 (including 22,000 deferred) and 465,000 life insurances. The Post Office is subject to severe competition from private companies in this branch of its business.

Various other facilities are also offered by this institution for the safe custody and due application of moneys of persons dying intestate or insane or without known heirs, or subject to proceedings in the county courts of law under certain conditions into which it is needless to enter.

The Post Office system has been extended to the Colonies, in some cases with marked success.

Enough has been stated to show the general scope of this Government institution and its attitude towards others working under independent management, especially friendly societies and all those with similar objects in view. Mr. Baernrether, in his book on "English Associations of working men," has noticed how large is "the class of voluntary highly educated and indefatigable labourers in the field," and it is no small aid to them to have a banking account well adapted to their needs, and where the funds they administer can be placed with perfect safety.

There is another point to which I desire to refer in this context. It would be a narrow view of thrift to assume that its advantages were to be measured only by the amounts accummulated. The sums annually paid in and withdrawn are not without their significance, for there are many subsidiary forms which present very genuine advantages. To take one of the most simple, that of "sharing-out clubs," to which subscriptions are paid for any purposes agreed upon, and the balance at the end of the year is divided without any obligation to renew the contribution for another term. The management is not too complicated even for unpractised members, who gain both experience and confidence by easy steps, and many permanent societies spring from these small beginnings. Holiday funds and guilds are a very useful form of thrift of this kind, which do much to promote both health and intelligence; moreover, the members acquire habits of forethought, and learn how to expend their means so as to make the most of them either for themselves or for others,

instead of flittering away small sums in ways which bring neither pleasure nor profit. Thrift is something more than mere parsimony, and judicious spending is an essential part of it.

The older institutions, many of them dating from the early part of the century, are distinguished as "*Trustee Savings Banks.*" They render full returns in a prescribed form to an official registrar, and security is required both from their paid and unpaid officials. But the State in no way controls their business or guarantees their stability These banks command a decided preference in Scotland. The average amount of deposits in them is about 30*l.*

Exact comparisons between the two systems cannot be made, as the accounts are rendered in different forms to different authorities. Practically they cover a great deal of the same ground, and afford support to the same kinds of thrift in many ways.

There has been a transfer of 4,000,000*l.* and 4,500,000*l.* from these to the Post Office banks since the establishment of the latter, leaving 46,500,000*l.* in 382 banks, with 1,580,000 separate accounts.

Roughly speaking there is an aggregate returned of 110,000,000*l.* in over 6,000,000 accounts, viz. :—

—	Post Office Barks.		Trustee Banks.	
	No. of Accounts.	Amount.	No. of Accounts.	Amount.
		£		£
England and Wales and Islands - - -	4,163,000	58,200,000	1,174,000	35,500,000
Scotland - -	160,000	1,400,000	346,000	9,100,000
Ireland - - -	185,000	3,500,000	49,000	2,100,000
Total - -	4,508,000	62,900,000	1,553,000	46,700,000
	average 14*l.* each		average 30*l.* each	

They are of course open to all classes of contributors who accept their conditions. The total savings in savings banks of all kinds may now be taken at fully 120 millions.

II.

Friendly Societies.—It is impossible to understand the present position of these and other more primitive associations for mutual support without bearing in mind the vast change of opinion which has taken place among what may be termed generally the wage-earning classes during the present century. The "charitable" or eleemosynary element was in earlier days most prominent, and the feeling that the young should contribute on equal terms for benefits shared with their older associates appeared natural at the time, and is by no means to be contemned as base nor dishonest. We are now in a state of transition between these simple expedients and a system more adequate to the wants of a higher

organisation of industry. One great object may now be broadly stated thus :—that the payments taken from each class of contributors shall be fairly assessed according to the nature and extent of the "benefits" offered, and that adequate reserves to meet them be so provided that each lodge may be self-supporting, and further that the dead weight of the present generation shall not be thrown upon the next. The difficulties surrounding the new problems arising have been very great. It may perhaps help us to form some idea of their magnitude to call to mind the despair of the Malthusian school at the prospect of an increase of population to a far less extent than that which has been actually realised and the greatest difficulty of all is with those who cannot yet be brought within these helpful organisations.

Space will not allow me to do more than glance very briefly at some of those which have done so much to forward the progress made.

Two of the older friendly societies especially have for many years past done excellent service in the collection of trustworthy material for acturial tables, viz. :—The Independent Order of Oddfellows (Manchester Unity) and the Ancient Order of Foresters have incurred heavy charges for professional skill in the construction of tables for the insurance not only of life, but for allowances in case of sickness, superannuation, and liability to accidents and disease in various trades and under different circumstances. The Independent Order of Rechabites has also made valuable contributions to statistics from the "total abstinence" point of view.

The directories of the two great orders show :—

In the Manchester Unity (1891)—

462 districts, 4,515 "lodges," and 673,000 members, the average for each "lodge" being 149.

In the Foresters (1890)—

279 districts, 4,728 "courts," and 694,000 members, the average for each "court" being 146 ;

and an aggregate amount of funds of 6,316,000*l.* (1889) for the former and 4,552,000*l.* (1891) for the latter, which afford some indication of the extent of their operations.

It should be explained that the term "Order" refers to the central governing authority, which exercises a powerful influence over the constituent district and local lodges (or courts), who directly undertake the responsibilities incurred in carrying out the work of these societies.

An estimate compiled from the returns made for the years 1881-5 indicated a total of at least 20,000 lodges and courts (including those of the two great orders already referred to), 3½ millions of members (average 175), and 18,500,600*l.* to 19,000,000*l.* of funds in hand. Some 6,000 lodges made no return during the period, many of which may have lapsed entirely, or been practically amalgamated with other societies. As regards the number of members, many subscribe to more than one lodge to secure the different benefits accorded by them. The next returns, now nearly due, will show much larger figures, certainly for the stronger orders.

A summary, only recently published in advance, of returns brought down to 31 December 1889 shows:—

"Societies with branches, *i.e.*, including the orders themselves and every district lodge or branch of such orders." The number of separate orders is about 100:

Registered number of orders and branches, 16,400; number of members, 1,728,000 (average 105); funds, 12,121,000*l.*

Independent societies:

Registered number, 10,426; number of members, 2,134,000 (average 205); funds, 9,289,000*l.*

There were also 30 collecting societies, the nature of which is referred to hereafter, with 3,319,000 members and funds amounting to 2,290,000*l.*

The "benefits" comprise: insurance in case of accident and during sickness, for the expenses of burial, and to some extent annuities to widows and orphans; in short, those which are of most pressing importance to their members.

It is not to be assumed that district or local lodges which are not from an acturial point of view in a satisfactory condition are to be deemed insolvent. In the far greater number of cases a very tolerable increase in the contribution or diminution of the benefits afforded would gradually bring them into a perfectly sound position, and meantime the goodwill of the affiliated bodies must count for something, and though each lodge has for the most part to stand on an independent basis those which are well managed may look for some support from the general funds in cases of undeserved pressure. The work is carefully subdivided. It has, for instance, been found necessary to make the allowances in case of sickness depend on the local lodges; in no other way can the personal supervision which experience has shown to be absolutely necessary be effectually maintained. Insurances for annuities, superannuation allowances, or for life, where the facts on which payment depends can be satisfactorily obtained, are undertaken by the districts from which a more adequate average of cases can be obtained.

As regards cases of actual fraud or even culpable mismanagement, those well acquainted with the subject declare that there are certainly not more in these societies than is to be found within the ordinary ranges of commerce and industrial enterprise. Irregularities and lax valuations are no doubt too common, and on these shortcomings a steady pressure is brought to bear, both by the Government departments acting within their own proper sphere, and by the strong moral influence of the leaders, especially of the great orders, on subordinate or independent lodges.

In spite of all difficulties these societies generally are managed with much rectitude, ability, and success. But the full results of their operations cannot as yet be given with statistical accuracy, though there is good reason to believe that much steady progress is being made throughout the country, both in the extent and in the stability of the work done by them.

I cannot here enter into the subject of *trades unions*; much of the work done by them is on the same lines as those of friendly societies, but

their objects are also political and the regulation of labour; "strike pay" and allowances for members out of work are prominent features in their organisation. Registration is open to all, and some avail themselves of it. Most trades have now their own unions the movement is a most important one in all its bearings, but on the industrial side it is as yet very imperfectly developed.

The last report of the Industrial and Provident Society (1889) shows the progress of *co-operative stores*. It gives for Great Britain a total of 1,428 stores, with 1,012,000 members, a working capital of 13,690,000*l.*, besides investments for 5,322,000*l.* more, and sales, chiefly to members, of over 39,000,000*l.*

Two of these are "wholesale," viz.:—

1 in Manchester, with 900 members and sales for 6,872,000*l.*,
1 „ Glasgow „ 251 „ „ 2,262,000*l.*,

which is a sound development of the movement, but these figures are not fairly comparable with those of retail trade. One (the London Civil Service Supply Association), starting from very small beginnings in 1866 now returns 5,077 members and sales for 1,772,000*l.*, which is an exceptional case (average, 350*l.*).

Of those engaged in retail trade, chiefly in the manufacturing districts:—

72 make sales of from 50,000*l.* to 100,000*l.* annually.
39 „ „ 100,000*l.* „ 200,000*l.* „
18 „ „ 200,000*l.* „ 350,000*l.* „
1, in Yorkshire, reaches 432,000*l.* with 3,820 members, or at an average of 110*l.* per member.
1, the largest society of all, is the "Leeds Industrial," with sales for 638,000*l.* and over 26,000 members, giving an average of 25*l.* each, which is much nearer the general proportion.

131

The remaining 1,294 vary very much in size; some are very small; a few make no returns, but for the most part they are flourishing and adapted to the wants of their several localities, but have no monoply of business in them. In many cases no credit is given, and in all or almost all it is very strictly limited.

The early promoters of this form of thrift, some 50 years ago, found multitudes of struggling men badly served and whose irregular payments could never have secured the supply of their needs on good terms. The first reform began at home, and on a sound basis of prompt payment a sound system was developed with admirable skill, perseverance, and energy, which has had futher a most beneficial effect upon the work of distribution generally, beyond their immediate sphere. The saving effected is divided among members in proportion to the extent of their purchases, and some societies have entered upon the extended field of co-operative production. As time goes on there is a tendency in them to merge into trading companies, the capital for which is mainly supplied by the older members.

Building societies are not engaged in actual building, but in granting loans for the purpose, which are supplied by a very large number of members. They vary much, both in size and the nature of their business. The registrar's returns (1890) showed nearly 2,500 societies in Great Britain, and an estimated number of about 710,000 members. Their total capital was 35,500,000*l.* and funds borrowed 15,000,000*l.*, in all over 50,000,000*l.* The assets were over 48,500,000*l.* in mortgages, and over 3,500,000*l.* in other securities and cash, in all 52,250,000*l.* About 2 per cent. only of these were in Scotland.

The first object of these societies was to enable men of small means to build house for themselves on thrifty terms, and much good work has been done in this direction, but it is to be apprehended that an element of speculation has been introduced into many of them, which has led to losses and disappointment. A great deal of building of this kind had also been carried on in other ways.

There seems no reason why a similar system should not be carried out in aid of the cultivation of "allotments" of land, but borrowing money is thrift only when it gets into the hands of thrifty and capable men with adequate knowledge of the business which they undertake.

The societies already mentioned, as well as "*cattle insurance societies*," "*certified loan societies*," "*working men's clubs*," "*specially authorised societies*," including those for *scientific* and *literary* purposes—all in short of an "*altruistic*" character—can readily —and many do—acquire by the simple act of registration a legalised status as corporate bodies, entitling them to act through their duly appointed officers in all matters concerning their internal and external affairs, and enjoy certain facilities adapted to the contingencies incidental to the work in which they are engaged, including that of availing themselves—but only at their own option—of the services of the public auditors and valuers. They are subject to the obligation of making returns of a similar kind to those required by law from other joint stock companies, but the State does not assume any of the responsibilities of management.

The influence of the leaders of friendly societies generally is in favour of the registration of all the lodges affiliated with them, and there is a marked tendency to strengthen those which are weak by amalgamation with others, so far as this is required to secure a higher order of efficiency.

Collecting societies are constituted both under friendly society and other Acts to carry down their operations to the poorest classes by a system of house-to-house collection of very small sums. A very large aggregate is insured in this way—mostly to provide for burials—both by registered and unregistered companies. No general returns can be compiled regarding them, but their receipts must amount to many millions of pounds annually subdivided into very small amounts.

The largest and most successful of these, the Prudential Assurance Company, founded on a very small scale in 1848, calls for a brief notice. The funds of its "Industrial" branch amount at the present time to

over 8,000,000*l.* The annual aggregate of its premiums, on 9¼ millions of policies, collected by payments of one penny to one shilling, the average being twopence a week, is about 3,750,000*l.* The expenses of collecting are necessarily a large percentage on such very small sums, requiring an extra loading of about 40 per cent. on the premiums. An apparent economy is here within reach of the payers, as much better terms could be afforded them for quarterly or yearly payments.

Notwithstanding this, one penny a week collected from the age of 20 secures 8*l.* 6*s.* at death, with some increase on policies of long standing, or 2*l.*, 2*l.* 16*s.*, or 4*l.* 16*s.* after 15, 20, or 30 years respectively, if the assured live so long, and a further payment of 1*l.*, 1*l.* 8*s.*, or 2*l.* 8*s.* at death, whenever it may happen, secured without further premium, by a "paid up" (deferred) policy, should it not occur till after the term of years stated. Insurances begun at other ages and for larger payments are made at proportionate rates. So also in case of failure to pay premiums, the policy is not entirely forfeited, but one "paid up" is granted in its place for the assessed value as for "surrender."

Their Table (C.) for infantile assurance—chiefly desired to meet the costs of burial—obviates one objection to which this practice is open. For the same sum of 1*d.* per week collected—but not for more—amounts, periodically increased, are paid from 1*l.* 10*s.* at 3 months up to 10*l.* at the age of 10 years, but nothing is paid in case of death within three months of the time when the policy is taken out. On the same principle policies are issued for the intermediate ages. The aggregate value of policies accepted on these terms is very large.

The industrial branch indirectly shares in profits by the revision of the tables of benefits and in other ways, which have effect retrospectively. 1,385,000*l.* have thus been added since 1879.

This company has done very much in the way of working out terms for insurance of various kinds on sound acturial bases, and their numerous tables are well worth study. Its "ordinary branch" is also well adapted to the wants of those of somewhat more ample means, and transfers are readily made from one branch to another.

The older assurance companies are also competing for business by granting policies for much smaller amounts than they would have thought worth their notice a few years ago.

The Birkbeck Bank affords another illustration of the general advance, starting in 1851 with 46 depositors with 578*l.* 18*s.* 4*d.* between them, it numbered 46,531 depositors in 1890 with 4,340,000*l.* It has branches for the investment of savings, for loans in aid of building, and for deposits on account. Such institutions have specially aided the independent class which has "neither poverty nor riches," and which has so largely increased during the present generation.

In conclusion I can only refer in the most general terms to the large amount of benefit funds of different kinds established in railway and other large companies, or to those of many employers of labour adapted to the special circumstances of those whom they employ, or to the many independent local efforts which do not come under public observation. They must make an aggregate of many millions of pounds, but there are

not sufficient data available on which to form any estimate of their amount.

But none of the associations to which I have referred were created by the Government, though their growth has made legislation necessary to meet the new requirements which have arisen from their creation.

Much has already been done, and much yet remains to be done Nothing will be gained by attempting to conceal the weaknesses and defects which yet remain, nor is there any disposition on the part of the responsible leaders of this great movement in aid of "thrift" to evade joining issue on many points which are yet open to discussion. In all parts of the country there are many willing learners in the great school of practical experience. The problem to be solved of the appropriate sphere (in this country) for State and individual action respectively fills the minds of many zealous and capable workers who are equally in earnest in their endeavours to remedy existing shortcomings and to merge the well meant and often heroic action of the past in a system more adequate to the higher scale of efficiency now required by our industrial organisation, and to carry out the true principles of co-operation, invigorated by a due sense of the mutual responsibilities of the State to the individual, and of the individual to the State, throughout the length and breadth of the country.

The Board and Lodging of London Work-Girls.

BY

F. H. Whymper, H.M. Superintending Inspector of Factories, Home Office, London.

If I omit those who live at home (the conditions of whose life are, therefore, those of the class to which they belong), and deal chiefly with makers of wearing apparel, &c., I may for my present purpose divide the female workers of the metropolis into three classes, viz.:—

(1.) Those who live in the establishments of their employers.

(2.) Those who live in "homes" or other boarding-houses especially designed for their reception.

(3.) Those who live in private lodgings.

Life in the Establishments of Employers.

1. Drawing upon information obtained some time since at some 25 of the largest drapers of the west central and western districts of the metropolis, I find that these were then employing indoors nearly 6,000 females, of which about 1,500 were "assistants" *i.e.*, saleswomen, and show-room hands, and over 4,000 were work-room hands, *i.e.*, milliners, dressmakers, or mantle makers. In three establishments none slept on the premises; in one only all did so, both assistants and workers, to the number of 140.

Of the aggregate number employed some 1,850 appeared to board and lodge on the premises, about 1,500 being assistants. The reason why the boarders were composed almost exclusively of the latter was because these are to the employer of far more value than the work-room hands. He is therefore anxious to take extra means of fixing the former in his employment. Heads of departments, first hands in the several workrooms, and apprentices have the next chance of lodging privileges, while the ordinary millinery and dressmaking hands, as persons whose place could be more easily filled up, form the contingent, which is for the most part, left to shift for itself as regards lodging.

Of the workroom hands it is the more capable who were usually lodged indoors. Non-residents often stop away, especially for two or three days after a regular holiday, and this is inconvenient to the employer in proportion to the skill of the person who absents herself.

I can express nothing but approval of the accommodation which I saw. Only a few indeed (as a rule, heads of departments, etc.) had at the time of my visit, a room to themselves, but under some firms there were never more than two in a room, and I was told at several places that steps were being taken to provide each person with a separate apartment. So large a number as five or six, and that in a large room was exceptional. The bedrooms themselves were clean, tidy, and usually airy and cheerful. The amount of sitting-room accommodation differed in different places. At one place I found four large sitting rooms for about 130 persons, with newspapers, periodicals, a large library, and pianos; at another, with about 100 persons, I found two sitting rooms, a library, a reading room, and a music room with piano, at a third, a sitting room for every 20 persons, with a separate club for women. Again, elsewhere, I was told of four bath rooms with fitted baths. I visited an establishment where two distinct houses, each with house-keeper, cook, and the necessary servants, were maintained for the indoor hands, a doctor in regular attendance being paid by the firm. From a member of another firm I heard that he had lately spent 1,500*l.* in the purchase of a library for his assistants.

The same reason which induces an employer to provide comfortable lodging, not to speak of luxuries, for a large proportion of his hands, viz., the value to him of the latter, would naturally cause him to see to the goodness and sufficiency of the food. I myself had a sight of two or three bills of fare, as well as of the food itself, and I could find no fault.

A fortnight each year was a usual length of vacation for those who had been some time in the same employ, and in cases, which came under my notice, they were paid wages for the period of absence, which were however, deducted from what the girls had to receive on leaving, if they left soon after their return to work. As a rule, the hands were allowed to go out after working hours, and to stay out till 10 p.m., 10.30 p.m., or 11 p.m.; but to return in a cab was frequently made an occasion of unfavourable comment on the part of the firm, followed by a demand for explanation of its use. At one place only might those who had been

employed continuously for more than four years, sleep out on Saturday nights without special leave. At others, permission had to be obtained, and in the case of juniors some document from parents or friends had to be produced, which must come by post, and into the authenticity of which strict inquiry was made. Sleeping out at all was absolutely forbidden elsewhere, except for proved unavoidable cause. The exact precautions taken to ensure respectability varied at different establishments, but in all there was evidence of care and of a sense of responsibility.

Some firms take apprentices, some do not. By one a premium of as much as 60 guineas was required, with the object of making it prohibitive. The supply of hands is obtained by various means, advertisements being perhaps the most general. Where schools are drawn upon, as in the case of a Roman Catholic school mentioned to me, the idea is that the clergy connected with it are likely to keep up communication with, and take an interest in, the welfare of their old pupils when these have passed out into the world, and the employer in question preferred the hands taken from these schools. An employer who had from 20 to 30 apprentices alone, and as many more always awaiting vacancies, drew his supply entirely from certain Sunday schools; he knew the surroundings and history of every one of his people, and was of opinion that an employer could make his hands what he liked. This was said in a neighbourhood of which I had been previously told that if we found much to complain of as regarded respectability of conduct, it would be there.

For residents, commencing wages may be said to vary between 12*l.* and 20*l.* a year, those for non-residents between 12*s.* and 18*s.* a week, though the employer just mentioned put those of his own employées at an average of 1*l.*, apprentices included, who, during their two years, were only partially paid by results. Under that system, viz., payment by results, one hand, a mantle maker, in this establishment was said to have earned 2*l.* 14*s.* 7*d.* in a week for botton-hole sewing by machine at 1*s.* per dozen, the working hours being from 9 a.m. to 8 p.m., with two hours out for meals. Here the hands were encouraged by what I may call commissions or premiums. If the average earnings of a girl were 18*s.* a week, 1*s.* was offered to her in addition should she succeed in earning 20*s.*, and so on. "In this way," says Mr. Gould, one of Her Majesty's Inspectors of Factories, to whom I am indebted for the above, "each worker has a direct interest in the total output of the "establishment."

A manager of a dressmaking department may receive from 120*l.* to 150*l.* per annum, or more; and first hands from 50*l.* to 80*l.* per annum.

The comfort of the residents had, of course, the first claims on the employer's care, but that of the day-hands was not neglected, as is shown by the following extracts from the details obtained at different places. They fairly represent the general practice.

"They are given dinner and tea on the premises." "All have tea "given by the firm, and conveniences are supplied for cooking dinner,

" which they bring with them." "Some are given dinner and tea, all " have tea." "Tea, bread and butter, &c. provided for all." "All " found with tea." "A dining room, kitchen and cook, who cooks " their own food, and also runs a joint on her own account." "About " 700, out of 900, get their meals in rooms provided by the firm, and " are allowed to warm their own food in the workrooms." "Room, " kitchen, caterer provided by firm, of which about half the day hands " avail themselves." "Rooms are being built for dress-making hands " to dine in, when a special person is to be engaged to cook their " food, and 1*d.* a head is to be charged." "All have their meals in the " house."

If, in addition to these advantages, it be remembered that the factory and local inspectors are responsible for the healthiness, if not for the comfort, of the workrooms themselves, it will be seen that as far as what went on within the walls of the larger drapers, much was done on behalf of the workers, whether they slept on or off the premises.

Life in "Homes."

2. The "Homes" which I saw or heard of in the central or western parts of London north of the Thames were over a dozen in number. In London south of the Thames, I found but one, and that one was occupied almost exclusively by servants. "Homes" are, as a rule, largish houses, of the "two front windows on the ground floor and " three on the first floor" kind, and are many of them situated in streets which have been deserted by fashion in its migration westwards and southwards. They are therefore central, and comparatively spacious. They are, for the most part carried on under the auspices of benevolent societies,* and are managed by a lady superintendent, with or without a controlling committee of ladies, though one or two owe their origin and maintenance to the charitable enterprise of individuals acting entirely on their own responsibility, and without assured support. At the time of my inquiries I reckoned that the whole number of beds offered exceeded 500, and this has since been considerably increased, 70 beds being, as I am told, the most to be found in a single "home." There were separate rooms and dormitories, the beds in the latter being divided by partitions, or curtains. All arrangements, both upstairs and in the basement, struck me everywhere as excellent. Perhaps a specimen of their rules will best explain their aims and their system.

"I. It is earnestly desired that this house shall, at much as possible, be conducted on the plan of a family, therefore cheerful compliance with the household rules, which must be signed by each on entering the Home, is expected from all.

"II. Time.—Breakfast, 8 o'clock; supper on table from 8.30 to 9.15, nothing can be had after that time; prayers at 10. The gas is turned off at 11. Candles are not allowed in the bedrooms.

* One of these societies, that of the "Homes for Working Girls in London," maintains 13 admirable establishments.

will prove the very best inducement to girls to remain at home in the evening, and so preserve them in many cases from the dangers which beset them in the streets.

"My own congregation at Berkeley Chapel, Mayfair, during the many years while I was incumbent up to March 1891, supported two such houses, which afforded accommodation for 60 girls, and were nearly always full. The girls' payments for lodgings covered the cost for sleeping and all its contingent expenses. We had to supplement this each year by a sum which represented the rent of the drawing-room and dining-room and the cost of superintendence.

"One case out of many similar ones which have come under my notice will illustrate what I have above expressed. A girl, S. A., well brought up in the country, obtained employment at a milliner's in London. She took a lodging near her place of business. She assured me that after her day's toil a quiet evening at home would have been more enjoyable than any place of amusement, but she said that after the family life she had led, the utter misery of living alone, with no one to speak to, became so intolerable that she thought she would go out of her mind. She therefore often took a walk of an evening alone. 'It was something,' she said, 'to see others happy, and to hear them 'talking to each other.' One evening an elderly gentlemen spoke to her, saying he mistook her for somebody else. He spoke kindly, and she was so pleased to get someone to talk to that they walked on together. This was the first interview, but not the last. When I met the girl, she had been ruined; loneliness had caused her to be in the way of temptation.

"This is only a sample of very many cases which I have known of girls drifting to destruction in the terrible streets of London."

In the above, Canon Shore attributes no special evil influences to the lodging itself. Loneliness alone was the origin of the evil. But there are too many lodgings in some of the districts of London where the moral atmosphere is nothing short of pestilential. What these may be like I will show by an extract from another letter, from a clergyman well known for his benevolent exertions.

"I give you a case that recently occurred. It is an illustration of many others. Two sisters, workgirls, lodged at Mrs. ———'s house in this parish. The one had a child, went into the workhouse, and, I believe, has died. The other, younger sister, still living in the same lodgings, has either fallen or is on the verge of it. The woman who keeps the lodging-house and her daughter have both had illegitimate children, though in the latter instance the father has since married the girl. Several other workgirls live in the same house."

Conclusion.

Having now dealt with the three classes into which I divide the workgirls, viz., those who live under the roof of their employers, those who live in "homes" or boarding-houses specially designed for their reception, and those who live independently in private lodgings, I think I shall best conclude with a few words about the considerations which

should govern our efforts to get the homes occupied in preference to private lodgings, for as regards lodging with the employers the choice is not with the girls. And we must remember that a preference for the "homes" on the part of the girls is not at all a matter of course. Many beds are often empty, and some lady superintendents complain that applicants for them are slow to present themselves.

I think the solution of this difficulty is to be found by bearing in mind that we cannot force girls into these establishments. Were we able to do so in the same way that one sends a child to school, much might be possibly said in favour of a strict, even if distasteful, regimen; and the lapse of time might be relied upon for reconciling inmates to a system which is intended for their good. But we cannot force them. So there is but one alternative left, and that is to attract them. With this object in view the prospective life of the "home" should be shown to them in as pleasant a light as possible; its rules should be of the simplest, and all needless formalities should be dispensed with. On this head, I will quote a lady whose house is always full. She says, "the "more experience I have, the more sure I feel that the fewer the rules, "and the simpler they are, the better." I may also here speak from some little knowledge of my own. The stock objections which have been opposed to my recommendations of "home" life have had for their gist the conviction that the daily routine was monotonous and narrow, and that the restrictions were irksome. An erroneous conviction no doubt; but still, there it was. It kept, and still keeps, inmates away; and it has to be taken into account if the "homes" are to succeed as we would have them succeed.

Even the name "home," appropriate though it be, seems associated in the minds of many of the girls with some improving or even penitential system. Entrance into a "home," some of them fancy, implies some antecedent fault of omission or commission on their part, which renders them fit subjects for reformation, and this idea naturally enough they cannot bear. For what is a country girl's motive in coming up to London to look for work? I say a country girl, because it is to such an one that the need of lodging is most likely to present itself. Is her prominent desire to be improved or reformed? Not in the least. She comes up that she may earn her living where she conceives that her chances will be best, and where she will have exchanged the hum-drum life of the country or country town for the larger atmosphere of the great city. She does not at the outset understand the trials and temptations of the solitary lodging. Even if she does know of the existence of such places as the "homes," her notion of them is such as I have suggested, while in the lodging she sees, at all events, freedom. Before she has time to learn better the mischief may have been done.

Let then, as a first condition of success, the houses of residence be made as attractive as is consistent with the girl's calling in life, and with the maintenance of a well-ordered household. Let it be remembered that the large majority of inmates will be of an age when amusement and excitement of some sort is almost indispensable, and that if they do not get these under the healthy influences of the "home," they will go

out thence, and get them elsewhere. How far you may safely venture in this direction is for the decision of those experienced persons who manage the several establishments; but assuredly the direction itself is the right one.

And in the second place, more publicity is wanted. I have dwelt on the unfair prejudice against the "homes" entertained by some of those who should be the very persons to reap their advantages; but I believe a large number of female workers know nothing of them at all. Here, perhaps, Her Majesty's Inspectors of Factories might lend a helping hand without impropriety. Their ordinary visits to factories and workshops, involving as they do, conversations with employers, with managers, and with work-people, give them exceptional opportunities of mentioning and recommending such institutions as those of which I write. Nor do I think that in so doing they would be thought officious. Employers do not take in bad part suggestions which seem to be prompted by the circumstances of an official's own proper work; nor would inspectors be worth their salt if they always confined their suggestions to those things which they have actual power to enforce.

Bericht über die sozialstatistische Ausbeute der Arbeiterversicherung.

VON

Dr. Georg von Mayr, München.*

Im Jahre 1887 habe ich für den IV. demographischen Congress in Wien einen Bericht† erstattet über die "Grundlagen für die Statistik "der Verhältnisse der industriellen Arbeiter mit besonderer Berücksich-"tigung der beim Hilfskassenwesen getroffenen Einrichtungen." Ausser einer allgemeinen Überschau der Quellen der Sozialstatistik habe ich dabei namentlich auf das reiche Material hingewiesen, welches die damals in Deutschland schon seit einiger Zeit eingerichtete, in Österreich in der Einführung begriffene allgemeine obligatorische Zwangsversicherung der Arbeiter gegen Krankheit und Unfälle gewährt.

In sachlicher Übereinstimmung mit meinen Vorschlägen beschloss der demographische Congress (V. Section des VI. internationalen Congresses für Hygiene und Demographie) Folgendes:

1. Der IV. demographische Congress erachtet es für angemessen, dass die Entwicklung der Statistik der Arbeiterversicherung zunächst den einzelnen Staatsverwaltungen überlassen und von Aufstellung eines internationalen Programmes der demographischen Anforderungen an diese Statistik zur Zeit abgesehen werde.

* Nunmehr in Strassburg.

† Congress-Schriften, Heft No. XXIV. Wien, 1887.

2. Der Congress bestellt in der Person des Herrn v. Mayr, Strassburg, einen Referenten, welcher beauftragt ist, die Einrichtungen der Arbeiterversicherung und insbesondere die Gestaltung des dabei im Rohen und in der Verarbeitung anfallenden demographischen Materials an Massenbeobachtungen international zu studiren und das Ergebniss seiner Studien zur Kenntniss des nächsten demographischen Congresses zu bringen.

Auf Antrag des Herrn von Inama-Sternegg, Präsidenten der k. k. statistischen Centralcommission in Wien, wurde dazu weiter noch beschlossen:

3. Der Congress erachtet es für geboten, dass jede die Organisation des Hilfskassenwesens begründende Gesetzgebung auch Bestimmungen über die Gewinnung und Sammlung des bezüglichen Materials aufstelle und eine einheitliche amtliche Aufarbeitung dieses arbeitsstatistischen Materials erfolge.

Anderweitige Arbeiten haben es mir leider nicht möglich gemacht in dem Umfange, wie ich es nach dem ehrenvollen Auftrage des Congresses gesollt und auch persönlich gewollt hätte, die in Frage stehenden Studien zu betreiben. Doch darf ich wohl immerhin, wenn es sich dabei auch nur um eine bescheidene Leistung handelt, auf die eingehende Analyse der Bedeutung der deutschen Kranken- und Unfallversicherung Bezug nehmen, welche in zwei dieser Frage von mir gewidmeten Untersuchungen enthalten ist. Diese Untersuchungen sind im ersten Bande des Archivs für soziale Gesetzgebung und Statistik (1888) unter der Bezeichnung "Arbeiterversicherung und Sozialstatistik" und in erweiterter Form im Bulletin de l'Institut international de Statistique (1889) unter der Bezeichnung "Die Quellen der Sozial-" statistik mit besonderer Rücksicht auf die Einrichtungen der Arbeiter-" versicherung" enthalten. Eine wichtige Ergänzung zu diesen Studien bildet für die Kranken- und Unfallversicherungsstatistik in Österreich, wo man zuerst dem deutschen Beispiele der öffentlich-rechtlichen Zwangsversicherung der Arbeiter folgte, die Arbeit von Dr. Ertl, "Soziale Versicherung und Statistik in Österreich," im dritten Band (1890) des Archivs für soziale Gesetzgebung und Statistik (Tübingen, Laupp'sche Buchhandlung).

Ich habe meinen Auftrag stets so aufgefasst, dass dabei in erster Linie die sozialstatistische Bedeutung der *öffentlich-rechtlichen* Arbeiterversicherung, wie solche zuerst in Deutschland eingeführt worden ist, in Betracht komme. In der That ist es auch diese Form der Arbeiterversicherung, welche am meisten die Möglichkeit umfassender und gleichartiger sozialstatistischer Ausbeute bietet, weil der staatliche Versicherungszwang die gleichmässige Erfassung der gesammten diesem Zwang unterworfenen Arbeitermassen durch die Versicherungsverwaltung und deren Statistik sichert. So gewiss es ist, dass das von Deutschland gegebene Beispiel in einer Reihe von Ländern Nachahmung finden wird, wie theils schon eingeführte, theils zur Einführung in Aussicht genommene Versicherungsgesetze verschiedener Länder ersehen lassen, so ist doch andererseits nicht zu bezweifeln, dass in einer Reihe anderer

Länder, wenn auch nicht jedes Eingreifen des Staats zu Gunsten der Arbeiterversicherung, so doch der staatliche Zwang zu solcher entschiedenen Widerstand finden wird. Es wäre desshalb für internationale Studien nicht richtig *nur* die öffentlich-rechtliche Zwangsversicherung in Berücksichtigung zu ziehen. Wenn desshalb auch im Folgenden, entsprechend den Erörterungen auf dem Wiener demographischen Congress, welche Anlass zu dem mir ertheilten Auftrag gegeben haben, in der Hauptsache auf die Verhältnisse des öffentlich-rechtlichen Versicherungswesens Bezug genommen wird, so soll doch auch weiter in einem Anhange kurz der freien Arbeiterversicherung aller Art gedacht werden, möge solche in einem gegebenen Lande ausschliesslich, mit oder ohne Betheiligung staatlich geleiteter Versicherungsanstalten, oder neben der öffentlich-rechtlich geordneten Arbeiterversicherung, für die in solche nicht einbezogenen Versicherungszwecke bestehen.

I. *Öffentlich-rechtliche Arbeiterversicherung.*

In den oben erwähnten Studien über die Statistik der deutschen und österreichischen Arbeiterversicherung ist eine ziemliche Fülle von Detailvorschlägen zur Ausgestaltung dieser Statistik enthalten. Ich stehe nun zwar heute, nachdem in Deutschland und Österreich die öffentlich-rechtliche Kranken- und Unfallversicherung seit einiger Zeit in Wirksamkeit ist, nicht mehr auf dem Standpunkte meiner Vorschläge von 1887, welche rein dilatorischer Natur waren und die Gestaltung der sozialstatistischen Ausbeute aus dem öffentlichen Versicherungswesen ohne Ertheilung eines Rathes zur Sache ganz und gar der Auffassung der einzelnen Staatsverwaltungen überlassen wollten. Ich meine, das allgemeine über die engeren Kreise der Staatsverwaltung hinaus gehende Interesse an einer guten Ausgestaltung der Sozialstatistik ist ein so bedeutendes, dass die berechtigte Vertretung der öffentlichen sachverständigen Meinung in diesen Dingen, zu welcher auch der demographische Congress gehört, ebenso befugt wie verpflichtet ist, darüber sich zu äussern was an sozialstatistischen Hauptergebnissen füglich erwartet werden darf, nachdem der entscheidende Hauptschritt, das zwangsweise Eingreifen des Staates zur Vermittlung der Versicherung, einmal geschehen und damit die Erfassung zahlreicher sozialstatistisch bedeutsamer Thatsachen derart sichergestellt ist, dass die richtige sozialstatistische Ausbeute nur davon abhängt, welche Form dieser Erfassung gegeben und wie die Technik der weiteren statistisch-technischen Ausnutzung der erfassten Thatsachen eingerichtet wird.

Gleichwohl aber erachte ich es auch heute noch nicht für angezeigt, dem demographischen Congress ein in alle Einzelheiten eingehendes Programm für eine internationale Statistik der öffentlich-rechtlichen Arbeiterversicherung vorzulegen. In zwei Beziehungen glaube ich mir vielmehr Beschränkung auferlegen zu sollen. Als Übergang zu der Reserve, welche sich der Wiener demographische Congress auferlegt hatte, zu einem thatkräftigeren Vorgehen, scheint es mir zunächst angezeigt, von weitgehenden Detailvorschlägen abzusehen, und nur einige wenige, dafür aber um so bedeutungsvollere Zielpunkte zu

bezeichnen, welche als sozialstatistische Früchte der Arbeiterversicherung international in Aussicht zu nehmen sind. Auch hiebei wird man noch im Auge zu behalten haben, dass es sich um Ziele eines Strebens handelt, von dem nicht zu erwarten ist, dass es sofort und allenthalben die vorhandenen nicht unbedeutenden Hindernisse seiner Durchführung zu überwinden im Stande sein werde.

Eine zweite Beschränkung scheint mir dahin angezeigt, dass nicht das gesammte Gebiet der öffentlich-rechtlichen Arbeiterversicherung, sondern nur jenes der Kranken- und Unfallversicherung ins Auge gefasst wird. Nicht berücksichtigt wird desshalb insbesondere die öffentlich-rechtliche, zwangsweise geregelte Invaliditäts- und Altersversicherung, welche bisher überhaupt nur in Deutschland und auch da zu kurze Zeit in Wirksamkeit ist, als dass über das Maass der sozialstatistischen Anforderungen, welche—zumal bei deren eigenartiger Organisation—an dieselbe gestellt werden dürfen, jetzt schon ein zuverlässiges nationales, geschweige internationales Ansinnen gestellt werden könnte. In dem Augenblicke, in welchem die Verwaltung in emsiger zielbewusster Thätigkeit grosse Kraftsanstrengungen macht, um das grossartige Räderwerk der Invaliditäts- und Altersversicherung in Gang zu bringen und zu erhalten, würde sie noch zu wenig geneigt sein, weiteren Mühewaltungen, wie sie die sozialstatistischen Pläne naturgemäss mit sich bringen, sich sympathisch zu erweisen.

Der innere Grund, warum gerade das öffentlich-rechtliche Versicherungswesen in eminentem Sinne Quell der Sozialstatistik ist, liegt darin, dass die öffentlich-rechtliche Regelung für alle Betheiligten die Nothwendigkeit und die Pflicht der Klarlegung der für die Versicherungsverwaltung massgebenden Thatsachen schafft. Diese Thatsachen aber sind zugleich für die Sozialstatistik von hoher Bedeutung. Indem der Staatssozialismus des Versicherungszwangs diese Thatsachen zielbewusst und ständig klar legt, trägt er in das vorher im Halbdunkel der Unklarheit, wenn nicht im Dunkel vollen Geheimnisses, gelegene Gesammtgebiet der produktiven Thätigkeit ein Moment erhöhter Publicität, welches nicht nur dem sozialpolitischen Programm der Arbeitermassen genehm, sondern auch—wie nun einmal die Stellung von Kapital und Arbeit geworden ist—schliesslich auch im Interesse der Arbeitnehmer gelegen ist, unabhängig hievon aber—und diess ist es was uns zunächst hier interessirt—der sozialstatistischen Thatsachenfeststellung in hohem Grade günstig ist.

Wenn wir die Hauptpunkte festlegen wollen, bezüglich deren eine sozialstatistische Ausbeutung des öffentlich-rechtlichen Versicherungswesens geboten ist, so müssen wir unterscheiden (1) die sozialstatistisch bedeutsamen Nachweise, welche sich *direkt* aus einer wohlgeordneten Buchführung über die fraglichen Versicherungsanstalten ergeben, (2) jene Nachweise, zu deren Sammlung die Versicherungsverwaltung nach ihrer besonderen Einrichtung *indirekt* Anlass gibt.

Es möge gestattet sein, zunächst kurz den Inhalt der international wünschenswerthen Hauptpunkte dieser Nachweisungen anzuführen, und dann der Methode der Gewinnung dieser Nachweise einige Worte zu widmen.

A. INHALT DER ZU BEFÜRWORTENDEN NACHWEISE.

a. Direkt erzielbare demographische Aufschlüsse, deren Gewinnung allgemein wünschenswerth ist.

1. *Krankenversicherung.*

Die Morbiditätsstatistik hat einen berechtigten Anspruch darauf, dass das Massenmaterial, welches bei der Versicherungsverwaltung anfällt, ihr nutzbar gemacht werde. Damit richtige Vergleichungen ermöglicht werden, ist dafür zu sorgen, dass die persönlichen Verhältnisse der Versicherten überhaupt, und derjenigen, für welche die Versicherung fällig geworden ist, in völliger Übereinstimmung dargelegt werden. Auch ist der correcten Ermittlung des zu Vergleichungszwecken besonders wichtigen Standes an Versicherten die mit den Rücksichten auf die Belästigung der Versicherungsverwaltung zu vereinbarende grösstmögliche Aufmerksamkeit zuzuwenden. Die Vorschläge, welche ich mir hienach in Betreff der Krankenversicherung gestatte, sind folgende:

α. Es ist erwünscht, dass sowohl der *Gesammtstand der Versicherten* wie die Zahl derjenigen, deren Versicherungsanspruch fällig geworden ist (*Erkrankte, Gestorbene*), unterschieden werden, nicht nur nach dem Geschlecht, sondern auch innerhalb beider Geschlechter nach (*a*) Alter, (*b*) Civilstand, (*c*) Beruf, mit möglichst weitgehender Gliederung im Einzelnen. Erwünscht ist ferner eine Unterscheidung nach der Beschäftigungsart (Arbeitsrangstellung) für diejenigen, deren Versicherungsanspruch fällig geworden ist, soweit es durchführbar ist, auch für den Gesammtstand der Versicherten.

Soweit ein so weitgehendes Programm auf Schwierigkeiten stösst, erscheint mindestens die Combination von Geschlecht und einigen Haupt-Alters- und Berufsgruppen geboten.

Allgemein erwünscht ist, dass Eintritte und Austritte aller Art sorgfältig berücksichtigt werden und dass in erster Linie der mathematisch correcte Durchschnittsstand an Versicherten für das Rechnungsjahr ermittelt wird; soweit solches nicht möglich ist, kann eine Durchschnittsberechnung aus dem Versicherungsstand am Monats- (besser Halbmonats-) Anfang Platz greifen.

β. Die Statistik der *Erkrankungen* soll die Arten der Krankheiten unterscheiden mit Darlegung für einige Haupt-Altersgruppen; mit Berücksichtigung der Zeit des Krankheitseintritts und der Dauer der Erkrankung.

Erwünscht ist ferner, dass mindestens bei den hauptsächlich ins Gewicht fallenden Krankheiten eine Unterscheidung nach Berufsgruppen der Erkrankten gegeben wird.

2. *Unfallversicherung.*

α. Es ist erwünscht, dass für die *Versicherten* wie für die *von Unfällen Betroffenen* dieselben Personalnachweisungen geliefert werden wie sie oben unter 1. α. bezüglich der Krankenversicherung formulirt sind.

β. Die *Statistik der Unfälle*—d. h. derjenigen Unfälle, welche als entschädigungspflichtig erscheinen — ist fortlaufend in eingehender Gliederung aufzustellen; sie soll ausser den zu 2. α. erwähnten Personalnachweisen enthalten an *sachlichen* Nachweisen: 1. die Verletzungen nach ihrer Schwere und ihren Folgen; 2. die Art der Verletzungen und verletzte Körpertheile; 3. die Zeit des Unfalleintritts; 4. die Betriebseinrichtungen und Vorgänge, bei welchen sich die Unfälle ereigneten; 5. die muthmasslichen Ursachen der Unfälle.

Bezüglich der statistischen Zusammenstellung des hiedurch zu gewinnenden Urmaterials ist erwünscht, dass namentlich die Hauptgruppen der verschiedenen Betriebsarten und die Grössengruppen der Betriebe auseinander gehalten werden.

B. Indirekt anfallende sozialstatistische Nachweise.

Es liegt im Wesen der öffentlich-rechtlichen Arbeiterversicherung, dass dieselbe bei Bemessung der Versicherungsbeiträge mehr oder minder eingehend eine Bezugnahme auf die Lohnverhältnisse enthält. Namentlich da, wo es darauf ankommt, die Leistungen der Arbeitgeber proportional dem Risico zu gestalten, welches bei den einzelnen Betrieben obwaltet, liegt es in der Natur der Sache, dass die Versicherungsgesetzgebung an den Aufwand der Unternehmer für Lohnzahlung anknüpft und diesen Gesammtaufwand oder gewisse durch das Gesetz näher bezeichnete Bestandtheile desselben zur Grundlage der Bemessung der Unternehmerbeiträge wählt. Hiedurch ist zwar nicht direkt, wohl aber indirekt die für die Zwecke der Versicherungsverwaltung geschaffene beschränkte Publicität des Aufwands der Unternehmer für Löhne geschaffen. Die Ingerenz der Staatsverwaltung, welche hiedurch nicht zu Gunsten statistischer Neugierde, sondern für einen ganz bestimmten Verwaltungszweck geschaffen ist, ermöglicht es, an die Erreichung dieses Verwaltungszweckes gleichzeitig die sozialpolitisch so bedeutsame Erzielung einer allgemeinen Lohnstatistik unter den günstigen Vorbedingungen anzuschliessen, welche im Allgemeinen überall da gegeben sind, wo eine statistische Ermittlung nicht als primärer Selbstzweck der Verwaltung, sondern als sekundärer Zweck neben einem primären anderweitigen Verwaltungszweck auftritt.*

Um die durch die Bezugnahme der Versicherungsgesetzgebung auf die Lohnverhältnisse angebahnte materielle Verwaltungs-Publicität der Lohnzahlungen zu einer auch für die Lohnstatistik brauchbaren Grundlage umzugestalten, ist der formelle Ausdruck dieser Verwaltungs-Publicität dahin erforderlich, dass die Verpflichtung der Unternehmer zur Aufstellung vollständiger, nicht bloss summarischer, sondern die individuellen Lohnzahlungen enthaltenden Lohnzahlungslisten, und zur Einreichung dieser Listen an die Verwaltungsbehörden festgestellt wirden; eine Verpflichtung, deren Grundlagen in der geltenden deutschen und österreichischen Unfallversicherungsgesetzgebung bereits geschaffen sind.

* Das Nähere hierüber in meinem Artikel: "Statistik und Verwaltung" in dem von mir herausgegebenen Allgemeinen Statistischen Archiv, Band 1, 1890 S. 33 u. ff. (Tübingen, Laupp'sche Buchhandlung).

Es liegt in der Natur der Sache begründet, dass die öffentlich-rechtliche Arbeiterversicherung, insoweit sie Leistungen von den Arbeitgebern und Arbeitnehmern verlangt, in irgend einer Weise an das Maass der Lohnzahlung oder des Lohnempfangs anknüpft. Namentlich dann, wenn irgendwie den Arbeitgebern allein die Beitragspflicht obliegt, ist es sehr begreiflich, dass zur Bemessung der verhältnissmässigen Beitragspflicht der einzelnen Unternehmer auf deren Lohnzahlungen —sei es den Gesammtbetrag oder gewisse "anrechnungsfähige" Bestandtheile desselben—Bezug genommen wird. So ist insbesondere die Sache bei der deutschen und österreichischen Unfallversicherung geregelt. Dadurch ist die Möglichkeit gegeben, die Grundlagen einer *allgemeinen Lohnstatistik* zu gewinnen. Hiezu ist aber allerdings erforderlich, dass Vorkehrungen getroffen werden, welche für die Zwecke der Verwaltung (mit Einschluss der statistischen Verwaltung) die volle Klarlegung der Lohnzahlung an die *einzelnen* Arbeiter sicher stellen. Um die Grundlagen einer solchen *allgemeinen*, die grossen Massen der Arbeiter erschöpfenden Lohnstatistik zu gewinnen, ist es hienach im Prinzip geboten,

> dass die Unternehmer verpflichtet werden, Lohnzahlungslisten aufzustellen und einzureichen, welche unter entsprechender Gruppirung der beschäftigten Personen nach ihrer Stellung im Betrieb (Arbeitsrangstellung) die Dauer der Beschäftigung jedes Arbeiters in einem gegebenen Zeitabschnitt (Rechnungsjahr) und den Betrag des demselben im Ganzen gezahlten Lohnes nachweisen.

Ich begnüge mich mit dieser principiellen Festlegung der statistischen Anforderung an die Klarlegung der Lohnverhältnisse seitens der Arbeitgeber, soweit eine solche gemäss der öffentlich-rechtlichen Einrichtung irgend eines Zweigs der Arbeiterversicherung geboten ist. Auf die besonderen Bestrebungen, welche sich in dieser Richtung in Bezug auf Verbesserung des aus der deutschen Unfallversicherungs-Einrichtung anfallenden Materiales auf dem jüngst (Juni 1891) in München abgehaltenen Verbandstage der deutschen Unfallversicherungs-Berufsgenossenschaften geltend gemacht haben, behalte ich mir mündliche Berichterstattung vor.*

Es ist auch nicht meine Absicht, auf die Einzelheiten der *statistisch-technischen Verarbeitung* des in Vorschlag gebrachten Urmaterials näher einzugehen; ich müsste sonst die ganze Frage der Ausgestaltung einer rationellen Lohnstatistik erschöpfen, was ich nicht als nächsten Gegenstand des mir gewordenen Auftrages ansehe.

Ich habe nur zwei die Grundfragen einer solchen Lohnstatistik berührende Gesichtspunkte zu betonen: (1) die Nothwendigkeit einer *Individualisirung* des Urmaterials in dem vorbezeichneten Sinne in der Art, dass für jeden einzelnen Arbeiter das Maass der Arbeitsleistung und die Gegenleistung an Lohn ersichtlich wird. Dass in jenen Fällen, in welchen nicht Zeitarbeit und Stundenlohn, sondern Stückarbeit und

---

* Vgl. unten den Nachtrag, p. 96, *post*.

Stücklohn in Frage ist, die exacte Nachweisung der Arbeitsleistung grössere Schwierigkeiten bietet, braucht kaum hervorgehoben zu werden. Es wird in diesen Fällen der exacte Nachweis der Lohnliste, welcher nur die Entlohnung in Geld (event. auch im Geldwerth von Naturalien) enthält, durch eine besondere sachverständige Enquête schätzungsweise bezüglich des muthmasslichen Maasses der Arbeitszeit in allen jenen Fällen zu ergänzen sein, in welchen die Einrichtung des Betriebs (insbesondere bei der Hausindustrie) es dem Unternehmer unmöglich macht, den Zeitaufwand des Arbeiters nach Stunden in derselben Genauigkeit anzugeben wie seinen eigenen Geldaufwand.

Zu betonen habe ich ferner, (2) dass das Gelingen der ganzen Lohnstatistik in entscheidender Weise abhängig ist von der Einrichtung der *Methode*, durch welche das Urmaterial an Lohnzahlungslisten statistisch-technisch ausgebeutet wird. (Siehe unten den Abschnitt B.) Sind diese beiden Vorbedingungen erfüllt, dann bietet die Herstellung einer allgemeinen zuverlässigen Arbeitsstatistik keine Schwierigkeiten mehr. Immerhin aber wird das Ziel einer statistischen Publicität der Lohnzahlung in allen ihren Einzelheiten nicht überall sofort erreichbar sein, und wird manches auf Seite der Unternehmer bestehende Vorurtheil zu überwinden sein. Aber auch auf Seite der Arbeiter wird man nicht ohne Weiteres geneigt sein, eine einseitig von Seite der Unternehmer aufgestellte Lohnzahlungsnachweisung als correct anzuerkennen. Es ist aber sozialpolitisch durchaus erwünscht, dass über die Zuverlässigkeit der allgemeinen Lohnstatistik auch in den Arbeiterkreisen keine Zweifel bestehen, und wäre es desshalb sehr erwünscht, eine Einrichtung zu treffen, durch welche eine gewisse Mitwirkung der Arbeiter bei der Aufstellung der Lohnstatistik ermöglicht wird.

Ich stelle in dieser Beziehung zur Erwägung,

ob es sich nicht empfiehlt, dass gemischte Ausschüsse (von Vertrauensmännern der Arbeitgeber und Arbeitnehmer) eingesetzt werden, welche die von den einzelnen Unternehmern aufgestellten Lohnzahlungslisten probeweise durchsehen und im Falle der Beanstandung mit den betreffenden Unternehmern zur Behebung untergelaufener Fehler ins Benehmen treten.

Sollte es für bedenklich erachtet werden, in dieser Weise den aus anderen Unternehmungen, welche Concurrenten angehören können, stammenden Vertrauensmännern Einblick in das Detail der Arbeitsorganisation und der Lohnverhältnisse eines Betriebs zu eröffnen, so wäre zu erwägen,

ob die Mitwirkung der Arbeiterschaft der einzelnen Betriebe etwa dadurch zu erreichen wäre, dass die Lohnzahlungslisten einer Erörterung in den für die einzelnen Betriebe bestehenden oder zu diesem Zwecke ins Leben zu rufenden Arbeiterausschüssen zu unterstellen, und eventuell nach Massgabe dieser Erörterungen, falls sich dabei Mängel ergeben, zu berichtigen wären.

diesem Falle die *fortlaufende* statistische Massenbeobachtung im Auge behalten werden. Dabei ist nicht zu vergessen, dass gerade der fortlaufende Charakter solcher Erhebungen deren Einleben bei allen Betheiligten am besten sichert. Auch ist zu erwarten, dass—wenn nur einmal mit gründlicher sozialstatistischer Arbeit seitens des Arbeitsamtes eines Staats der Anfang gemacht ist—das Verlangen nach regelmässiger Fortsetzung derselben so steigen wird, dass die entgegenstehenden Trägheitscoefficienten aller Betheiligten überwunden werden.

II. *Arbeiterversicherungswesen ausser der öffentlich-rechtlichen Zwangsversicherung.*

Wo öffentlich-rechtliche Zwangsversicherung der Arbeiter besteht, kann die Staatsgewalt einen *unmittelbaren* Einfluss auf die Ausgestaltung der Statistik der Arbeiterversicherung nehmen. Doch ist es auch in diesem Falle keineswegs nothwendig oder auch nur gebräuchlich, dass alles Detail der statistischen Nachweise durch staatliche Anordnung bindend festgestellt wird, es kann vielmehr auch in diesem Falle manche Einzelheit fakultativ gelassen werden. Erwünscht ist jedoch, dass bezüglich der Hauptpunkte eine gleichförmige Gestaltung der Statistik obligatorisch vorgeschrieben sei.

Schwieriger ist die befriedigende Gestaltung der Statistik der freiwilligen Arbeiterversicherung aller Art. Doch ist auch hier die Staatsgewalt bezüglich der Statistik nicht machtlos.

a. Soweit an der freiwilligen Arbeiterversicherung auch *Staatsanstalten* Theil nehmen, hat es die Staatsgewalt ohne Weiteres in der Hand, die Statistik im Sinne der oben unter I. entwickelten Vorschläge zu gestalten.

b. Mittelbar kann die Ausbildung der Statistik da gefördert werden, wo das *Gesetz* der Staatsgewalt das Recht gibt, von *Arbeiterversicherungs-Anstalten* aller Art *Rechenschaftsberichte* zu fordern. Damit in dieser Hinsicht wirksam vorgegangen werden könne, empfiehlt es sich, die Gesetzgebung soweit erforderlich dahin zu verschärfen,

> dass ausdrücklich nicht bloss rechnungsmässige Darlegungen, sondern auch statistische Nachweise in dem oben zu I. angegebenen Sinne—eventuell unter Bezeichnung der Hauptpunkte derselben im Gesetz—gefordert werden können.

Als Garantie gegen ein Übermass statistischer Anforderungen an die Privatanstalten mag die Zustimmung eines aus Staatsbeamten und Vertretern der betheiligten Privatanstalten gemischten Commission zum Erlass der statistischen Einzelvorschriften erfordert werden.

c. Als letztes Auskunftsmittel verbleibt das nicht auf positives Gesetz sich stützende Mittel des *Ersuchens* an die betheiligten Verwaltungen *freiwillig* die gewünschte Statistik zu liefern.

Wenn auch gehofft werden kann, dass im Laufe der Zeit die Einsicht vom Nutzen und der Nothwendigkeit der Sozialstatistik im Allgemeinen und der Arbeiterversicherungstatistik im besonderen mehr und mehr sich verbreiten und damit auch der Weg der freiwilligen Statistik immer gangbarer werden wird, so ist doch zu wünschen, dass dieser Weg nur

als letzte Reserve verbleibe, schon desshalb, weil auch bei Zunahme des guten Willens der Privatanstalten in Bezug auf Lieferung der Statistik überhaupt keine Bürgschaft dafür gegeben ist, dass dabei seitens der einzelnen Anstalten auch nur annähernd gleichmässig in der Gestaltung des statistischen Materials werde verfahren werden. Es ist desshalb dahin zu wirken, dass thunlichst *alle* Versicherungsanstalten zur Lieferung von Nachweisen durch Gesetz verpflichtet werden. Weiterer Erwägung mag es anheimgestellt bleiben, ob diess nur durch Androhung von Rechtsnachtheilen, oder auch durch eigentliche Strafandrohung—die wohl kaum zu umgehen sein wird—erreicht werden soll. Jedenfalls ist es erwünscht,

in irgend einer Weise die Verpflichtung zur Lieferung statistischer Nachweise (gewissen Umfangs und gewisser Gliederung) über die Ergebnisse der Arbeiterversicherung aller Art zu verallgemeinern.

Bezüglich der *Form* der Gewinnung der statistischen Ergebnisse aus dem von den Privatanstalten zur Verfügung zu stellenden Material muss die Staatsgewalt das grösste Entgegenkommen zeigen. Es muss desshalb nicht bloss die statistisch-technische Verarbeitung des Urmaterials centralisirt von Staatswegen vorgenommen werden, sondern es wird auch seitens des Staats, soweit es irgendwie die Arbeit der Anstalten erleichtert, schon die Herstellung der Individual-Zählkarten zu übernehmen sein.

Um, zumal für den Anfang, nicht zu grosse Schwierigkeiten zu schaffen, empfiehlt es sich, das Maass der Anforderungen an die von den Privatanstalten aller Art zu stellenden Anforderungen gegenüber den unter I. enthaltenen Vorschlägen zu *ermässigen*. Insbesondere wird darauf verzichtet werden müssen, die Statistik der Privatversicherung der Arbeiter zugleich zur Gewinnung einer allgemeinen Lohnstatistik zu benützen. Die oben erwähnte Verwaltungs-Publicität der Lohnzahlung, welche mit der öffentlich-rechtlichen Arbeiterversicherung sich naturgemäss verbindet, ist bei dem Mangel öffentlich-rechtlichen Charakters des Versicherungswesens gar nicht oder nur in geringem Maasse vorhanden. Auch wird man wohl Anstand nehmen, lediglich und unmittelbar zum Zweck der Lohnstatistik die Verpflichtung der Unternehmer zu solcher Lohnzahlungs-Publicität zu schaffen. Mindestens ist heute die sozialpolitische Auffassung der Mehrheit dafür noch nicht reif, während allerdings nicht zu verkennen ist, dass Angesichts der Stellung von Kapital und Arbeit gegen einander und bei der Stellungnahme zwischen und über den Parteien, welche der Staatsgewalt zufällt, das Bedürfniss der erwähnten Lohnzahlungs-Publicität in stetiger Zunahme begriffen ist.

Auch im Übrigen, soweit die Versicherungsstatistik im engeren Sinne in Frage ist, wird an dem unter I. aufgestellten Programm manches vereinfacht werden müssen, wenn es sich nicht um öffentlich-rechtliche, sondern um Privatanstalten handelt. Wie dabei im Einzelnen etwa vorzugehen wäre, mag—falls auf diese Frage überhaupt näher eingegangen werden soll—mündlicher Erörterung vorbehalten bleiben.

NACHTRAG

zu dem

BERICHTE von Dr. GEORG VON MAYR über die SOZIALSTATISTISCHE AUSBEUTE der ARBEITERVERSICHERUNG.

In meinem Bericht über die sozialstatistische Ausbeute der Arbeiterversicherung habe ich vorbehalten, mündlich Näheres über die Bestrebungen des Verbandes deutscher Unfall-Berufsgenossenschaften in Bezug auf Einführung einer zuverlässigen *Lohnstatistik* vorzubringen. Bei der grossen Bedeutung, welche diese Bestrebungen haben, und bei der Schwierigkeit, welche die bloss mündliche Auseinandersetzung eines vielgliedrigen Formulares bietet, wird es Billigung finden, wenn ich die in Aussicht genommene mündliche Darstellung durch den folgenden Nachtragsbericht einleite.

Die öffentlich-rechtliche Unfallversicherung der industriellen Arbeiter—von deren Lohnstatistik in Folgenden allein die Rede sein soll—ist in Deutschland berufsgenossenschaftlich unter Zusammenfassung verwandter Betriebsarten zu grossen, theils das Reich im Ganzen, theils grosse Gebietsabschnite desselben umfassenden Versicherungsanstalten geregelt. Die einzelnen Unternehmer sind die zur Aufbringung der Unfallentschädigungen verpflichteten Mitglieder der Genossenschaft, welche gesetzlich (§ 71 des Gesetzes vom 6. Juli 1884) verpflichtet sind binnen sechs Wochen nach Ablauf des Rechnungsjahres dem Genossenschaftsvorstand eine Nachweisung vorzulegen, welche u. A. enthält: " die während des abgelaufenen Jahres im Betriebe beschäftigten " versicherten Personen und die von denselben verdienten Löhne und " Gehälter." Dabei haben die Mitglieder der Genossenschaft nicht nur die für Ermittlung ihrer Beitragspflicht in Betracht kommenden sog. "anrechnungsfähigen" Löhne, sondern auch die *wirklich verdienten Löhne und Gehälter* anzugeben. Hiedurch ist die volle gesetzliche Grundlage zu einer genauen Lohnstatistik gegeben, welche noch der weiteren Verständigung über die Einrichtung der Erhebungsformulare (d. i. der Lohnnachweisungen) und über die Art und den Umfang der statistisch-technischen Ausbeutung dieser Erhebungsformulare bedarf. Bisher hat eine Nutzbarmachung des bezüglich der wirklich gezahlten Löhne von den einzelnen Berufsgenossen zu liefernden Materiales, für dessen Gestaltung eine bindende gemeinsame Norm fehlt, nicht stattgefunden, indem das Reichsversicherungsamt von den Berufsgenossenschaften nur eine summarische Angabe der in Anrechnung zu bringenden Lohnbeträge verlangt hat.

Erfreulicher Weise hat sich—unter dankenswerther Förderung dieses Strebens durch den hochverdienten Präsidenten des Reichsversicherungsamts, Herrn Dr. Bödiker—im Schoosse der Berufsgenossenschaften selbst der Wunsch nach einem Ausbau der Lohnstatistik auf der gegebenen gesetzlichen Grundlage mehr und mehr geltend gemacht. Der Verband der deutschen Berufsgenossenschaften, welchem letztere zwar nicht vollzählig, aber in überwiegender Zahl (42 von 64) angehören, hat die Frage der Lohnstatistik schon seit längerer Zeit in den Kreis

seiner Erörterungen gezogen. Auf dem Verbandstage zu Strassburg (1890) legte die vom geschäftsführenden Ausschuss niedergesetzte Commission (Referent Direktor Wenzel, Berlin) als das Ergebniss ihrer Berathung dar:

1. dass die Aufstellung einer guten Lohnstatistik im Interesse der deutschen sozialpolitischen Gesetzgebung ein unabweisbares Bedürfniss sei und dass gerade die Industrie selbst ein lebhaftes Interesse daran habe, dafür zu sorgen, dass zur Widerlegung der vielfach für agitatorische Zwecke verbreiteten unrichtigen Darstellung der Arbeitsverdienste unangreifbare Zahlen über die Erwerbsverhältnisse der industriellen Lohnarbeiter festgestellt werden;
2. dass die Berufsgenossenschaften besser als irgend eine andere Körperschaft oder Behörde in der Lage seien eine brauchbare Lohnstatistik zu liefern;
3. dass die praktischen Schwierigkeiten, welche sich angeblich der Ausführung einer berufsgenossenschaftlichen Lohnstatistik entgegenstellen, durchaus nicht oder wenigstens bei weitem nicht in dem Maasse, wie es von den Gegnern behauptet wird, vorhanden sind.

Der Verbandstag schloss sich grundsätzlich dieser Auffassung an und beschloss, den geschäftsführenden Ausschuss zu beauftragen, der Durchführung einer von den Berufsgenossenschaften zu bewirkenden Lohnstatistik die Wege zu bahnen und die ihm zu diesem Zwecke geeignet scheinenden Schritte zu unternehmen.

Die weiterhin mit der Angelegenheit befasste Commission des geschäftsführenden Ausschusses hat das Schema einer Lohnnachweisung formulirt und dasselbe auf dem Verbandstag zu München (Juni 1891) in Vorlage gebracht.

Mit Recht geht dabei die Commission von der Auffassung aus, dass die Zusammenwerfung der Löhne ganz verschiedenartiger Arbeiterkategorieen zu unbrauchbaren Ergebnissen führe. Sie stellt den Grundsatz der Individualisirung voran, und verlangt von den Schlusszahlen der Statistik eine Gliederung der Löhne nach Alter und Geschlecht, nach Wohnbezirk und Beschäftigung der Arbeiter.

Als unerlässlich wird es weiter angesehen, festzustellen, für welches Maass von Arbeitszeit ein bestimmter Lohn gezahlt wird. Es wird also neben der Höhe des Lohnes die Dauer der Arbeitszeit festgestellt werden müssen. Daraus ist weiter beabsichtigt, den Arbeitsverdienst auf den sog. "Vollarbeiter," d. h. einen Arbeiter, der jährlich 300 Arbeitstage à 10 Stunden thätig ist, zu reduziren, um "vergleichbare Zahlen" zu gewinnen, womit jedoch selbstverständlich das Gebiet der weiteren sozialstatistischen Ausnützung des durch eine genaue Verzeichnung der gezahlten Löhne gewonnenen Materials keineswegs erschöpft ist.

Das Erhebungsformular, welches die Commission in Vorschlag gebracht hat, beruht auf vollständiger *Individualisirung* der Angaben für die einzelnen Arbeiter. Dasselbe ist in der Anlage abgedruckt.

Bevor auf die Einzelheiten der Angaben eingegangen wird, sei jedoch bemerkt, dass die Commission in ihrer Mehrheit Bedenken getragen hat, die Angaben nach den *einzelnen Wochen* des Jahres in

i p. 2596. G

den von den Unternehmern an die Berufsgenossenschaften einzureichenden *Lohnnachweisungen* zu verlangen, während sie allerdings dafür ist, dass das Formular mit dieser Unterscheidung der Angaben nach einzelnen Wochen als *Lohnliste* für den eigenen Gebrauch des Unternehmers fortlaufend geführt werde, während die an die Berufsgenossenschaft einzureichende Lohnnachweisung nicht die einzelnen Wochenangaben, sondern nur die Jahresbeträge enthalten soll. Nach Ansicht der Commission soll hienach das anliegende Schema, soweit die Detaillirung nach Wochen in Frage kommt, das eigentliche—jedoch beim Unternehmer verbleibende *Erhebungsformular* sein, während die nur die Jahressumme enthaltende an die Berufsgenossenschaft einzusendende Lohnnachweisung das erste, allerdings noch immer für jeden Arbeiter *individualisirte Concentrationsformular darstellt.* Der Referent selbst steht—und zwar mit Recht—persönlich auf dem Standpunkt, dass der wochenweise Nachweis nicht bloss für den internen Zweck der Sammlung des Jahresausweises, sondern auch für sich behufs Berücksichtigung bei der Gliederung der statistischen Nachweise von Bedeutung sei. Sehr interessant ist die Mittheilung des Referenten über die Erfahrungen, welche in dieser Hinsicht bei der Berufsgenossenschaft der chemischen Industrie gemacht worden sind. Dort wird das (in der Anlage abgedruckte) fragliche Formular schon lange angewendet; als nun in einem Jahre der Versuch gemacht wurde, statt der Formulare mit wöchentlichen Lohnangaben Formulare einzuführen, in denen nur die Lohnsumme des ganzen Jahres einzutragen war, erhob sich lebhafter Widerspruch. Die Mehrzahl der Betriebsunternehmer hatte sich daran gewöhnt, die Eintragungen der Löhne in das Formular wöchentlich vorzunehmen und dann am Schluss des Jahres nur die Summe zu ziehen und der Berufsgenossenschaft einzureichen. Auf vielseitigen Wunsch beschloss desshalb der Vorstand der Berufsgenossenschaft der chemischen Industrie mit grosser Mehrheit, zu den alten Forderungen zurückzukehren. Mit Recht hebt der Referent auch hervor, dass nur bei Unterscheidung der Wochennachweise die Bedeutung des sog. Saisongeschäftes im wirthschaftlichen Leben der Arbeiter ersichtlich werde.

Gleichwohl war die Commission des Verbandstags der Ansicht, dass zur Zeit die allgemeine obligatorische Einführung *wöchentlicher Lohnnachweise* auf grosse Schwierigkeiten stossen würde, erwartet aber, dass die Genossenschaftsvorstände bereit sein werden, das vorliegende Formular in dem angegebenen Sinn als *Lohnliste* für ihre Mitglieder einzuführen. Dabei nimmt sie—was zugleich bezüglich der weiteren Erschliessung der Quellen der Sozialstatistik von allgemeinerem Interesse ist—darauf Bezug, dass nach dem neuen Reichsgesetz vom 1. Juni 1891, betreffend Abänderung der Gewerbeordnung (§ 139 *b.*) die Arbeitgeber verpflichtet sind, der staatlichen Aufsichtsbehörde oder der Polizeibehörde diejenigen statistischen Mittheilungen über die Verhältnisse der Arbeiter zu machen, welche vom Bundesrath oder von der Landes-Centralbehörde unter Festsetzung der dabei zu beobachtenden Fristen und Formen vorgeschrieben werden. Die Commission meint, es werde keinem Zweifel unterliegen, dass die Reichsregierung mit der Erhebung solcher sozialstatistischer Aufnahmen vorgehen werde und dass—falls nicht die

Berufsgenossenschaften in allernächster Zeit aus eigener Initiative den Mangel einer brauchbaren Statistik über die Erwerbsverhältnisse der industriellen Arbeiter zu beseitigen bestrebt sind—der Bundesrath seinerseits die Lücke ausfüllen werde. Dass aber dann die Anforderungen der amtlichen Statistik nicht hinter dem vorliegenden Schema zurückbleiben würden, gehe schon daraus hervor, dass der Direktor des kaiserl. statistischen Amtes, Herr von Scheel, diesem Formular seine Zustimmung gegeben habe und dass auch Herr Regierungsrath Evert vom königl. preussischen statistischen Bureau in der von ihm veröffentlichen Arbeit über Lohnstatistik* ganz unabhängig zu fast genau denselben Ergebnissen bezüglich des Fragebogens gekommen sei wie die Commission. (Bei den Berathungen des Verbandstages selbst wurden von einzelnen Rednern die Schwierigkeiten betont, welche die Aufstellung eines für alle Berufsgenossenschaften passenden Schemas bereite, und wurde desshalb das von dem Referenten vorgelegte Formular den Berufsgenossenschaften zur Annahme—soweit die Verhältnisse derselben die Anwendung des Formulars ermöglichen—empfohlen.)

Die in Frage stehende in der Anlage abgedruckte Lohnliste beruht, wie aus der Einrichtung der Kopfspalten des Formulars ersichtlich ist, auf strenger *Individualisirung* der Nachweise für die einzelnen Arbeiter. Jeder derselben soll aufgeführt werden nach Namen, Art der Beschäftigung, unter specieller Bezeichnung des Geschlechts, sowie nach seinem Alter. Der sachliche Nachweis für jeden einzelnen Arbeiter erstreckt sich auf die Zahl der Arbeitstage, die Gesammtzahl der Arbeitsstunden, den verdienten Lohn in Mark, wobei Accordlohn durch Unterstreichen besonders bezeichnet werden soll.

Die Commission geht bei ihrem Vorschlage von der Auffassung aus, dass die Individualfragen nach Namen, Geschlecht und Alter der Arbeiter im Unfallversicherungsgesetz begründet sind. Was speciell die Frage nach dem Alter—welche wegen der jugendlichen Arbeiter von Bedeutung ist—anlangt, so wird hervorgehoben, dass es für viele Betriebsunternehmer leichter sei, unmittelbar das Alter des Arbeiters anzugeben, als die Frage zu beantworten, ob der Arbeiter im Sinne der Gewerbeordnung zu den jugendlichen zähle. Ueberdiess werde die Altersangabe der Arbeiter heute für so viele Zwecke (Krankenversicherung, Alters- und Invalidenversicherung) gefordert, dass der Unternehmer im Allgemeinen diese Frage mit Leichtigkeit beantworten könne. Dazu wird als zweckmässig empfohlen, die Frage dahin zu ergänzen, dass die Altersangabe für den 1. Januar oder 1. Juli des Erhebungsjahres gemacht wird.

Zur Begründung der im Unfallversicherungsgesetz nicht begründeten Fragen "Art der Beschäftigung" und "Ist der verdiente Lohn Accordlohn" wird Folgendes ausgeführt. Bei der ersten Frage handelt

* Kritische Bemerkungen zu einigen lohnstatistischen Vorschlägen. Zeitschrift des k. preuss. statist. Bureaus, 1890, III., S. 267. Hervorragendes auf dem Gebiete lohnstatistischer Forschungen enthalten die amtlichen statistischen Veröffentlichungen des Königr. Sachsen (Dr. Böhmert), der Stadt Berlin (Dr. Böckh) und des Königr. Italien (Bodio). Beachtenswerth ist auch ein kürzlich erschienener Artikel von Dr. Hirschberg (Berlin), "Zur Lohnstatistik der Berufsgenossenschaften" (Die Arbeiterversorgung, VIII. Jahrg. Berlin, 1891. No. 18).

es sich wesentlich um Unterscheidung der "gelernten" von den "ungelernten" Arbeitern. Diejenigen Arbeiter, die zu allen möglichen Beschäftigungen im Betriebe herangezogen werden, haben in der Regel eine technische Vorbildung nicht genossen, und sind desshalb in dem Formular einfach als "Tagearbeiter" aufzuführen; bei den qualifizirten Arbeitern wird es meist leicht sein, die Frage nach der Art ihrer Beschäftigung zu beantworten. Zur Frage nach den Accordlöhnen wird nicht verkannt, dass eine absolut genaue Trennung der Tage- und Accordlöhne sehr grosse Schwierigkeiten bereiten würde, weil mannigfache Verbindungen beider Lohnsysteme vorkommen.

Das im Vorstehenden besprochene, aus den Kreisen der Betheiligten empfohlene und auf vollster Individualisirung beruhende Schema einer Lohnstatistik, welches auf dem Verbandstag der deutschen Berufsgenossenschaften in München kürzlich (Juni 1891) vorgelegt worden ist, stellt einen bedeutenden Markstein in der Geschichte der lohnstatistischen Bestrebungen vor; ich wollte desshalb nicht unterlassen, dasselbe dem demographischen Congress im Originalabdruck vorzulegen.

Wie sehr übrigens in den betheiligten Kreisen das Hauptprinzip der lohnstatistischen Massenbeobachtungen, nämlich die Individualisirung für den einzelnen Arbeiter, Anerkennung findet, geht daraus hervor, dass dasselbe auch bei einem anders gefassten Schema einer Lohnnachweisung gewahrt ist, welches auf dem mehrfach erwähnten Verbandstag der deutschen Berufsgenossenschaften in München von der "Süddeutschen Textil-Berufsgenossenschaft" in Vorschlag gebracht worden ist. Die bezügliche Lohnnachweisung ist als "Sammelliste" bezeichnet, und stellt in der That nicht die Urliste der fortlaufenden Lohnzahlungen, sondern ein Concentrationsformular dar, welches zur Anbahnung der künftigen Zusammenstellungsarbeiten eine Unterscheidung der Arbeiter nach einigen Hauptgruppen enthält und für jede Gruppe die Arbeitszeit in Tagen und den Arbeitslohn in Mark ausweist. Aber auch dieses Zusammenstellungsformular ist individuell für jeden Arbeiter gedacht, und ergeben sich demgemäss folgende Kopfspalten des Formulars, welches auf je einer Zeile alle Angaben für jeden einzelnen Arbeiter enthält:

1. Laufende Nummer, bezw. Nummer der Hauptliste.
2. Des Versicherten Namen und Beschäftigung.
3. Männliche Erwachsene mit Lohn bis 4 M. täglich - - - } Arbeits- { Zeit: Tage. Lohn: M. Pf.
4. Weibliche Erwachsene mit Lohn bis 4 M. täglich - - - } " { "
5. Männliche jugendliche Arbeiter, Lehrlinge und Anfänger - - - } " { "
6. Weibliche jugendliche Arbeiter, Lehrlinge und Anfängerinnen - - } " { "
7. Männliche Empfänger von über 4 M. Taglohn - - - - } " { "
8. Weibliche Empfänger von über 4 M. Taglohn - - - - } " { "
9. Veranschlagung für Dienstwohnung, Verköstigung und Naturalbezüge: M. Pf.
10. Anrechnungsfähigkeit zur Umlage: M. Pf.

Das eigentliche Urmaterial der Anschreibung, aus welcher die vorstehende Sammelliste gefertigt wird, soll die von jedem Betriebsunternehmer zu führende *Hauptliste* bilden, in welcher die Auszahlungen im Einzelnen nach Namen, Alter, Beschäftigung, Lohn-Zeiten und Beträgen fortlaufend nachzutragen sind. Der Nachweis von Namen und Beschäftigung soll in der Sammelliste, Sp. 2, erlassen werden können, wenn die laufenden Nummern der Hauptliste und der Sammelliste übereinstimmen und die Verpflichtung übernommen wird, die Hauptliste, wenn erforderlich, sofort vorzulegen. Zweifellos stellt auch dieser Vorschlag der süddeutschen Textil-Berufsgenossenschaft gegenüber den bisherigen lohnstatistischen Nachweisen der deutschen Unfallversicherung einen bedeutenden, aber doch nur halben, Fortschritt dar. In der Sammelliste ist nur eine sehr unvollständige Ausnützung des statistischen Urmaterials enthalten, dessen Anschreibung in der Hauptliste obligatorisch sein soll. Entschliesst man sich aber einmal, die Individualangaben für jeden Arbeiter, wie sie in der Hauptliste enthalten sein sollen, zu verlangen, dann ist es geboten, dieselben auch zur allgemeinen statistischen Ausnützung zu bringen. Der Vorschlag der Commission ist desshalb jenem der süddeutschen Textil-Berufsgenossenschaft weitaus vorzuziehen.

Über die Art der *statistisch-technischen Ausnützung der Lohnnachweisungen zu einer Lohnstatistik* verbreitet sich der Antrag der Commission, soweit Umfang und Gliederung der Nachweise in Betracht kommt, nicht eingehend, sondern begnügt sich mit der Angabe einiger allgemeiner, oben bereits hervorgehobener Gesichtspunkte. Als Instanz der statistisch-technischen Verarbeitung des Urmaterials sind die einzelnen Genossenschaftsbureaus gedacht. Hier setzen meine Bedenken ein. Diese gründen sich nicht sowohl darauf, dass die Arbeit doch bedeutender sein wird als die Commission annimmt, welche glaubt, dieselbe "durch zeitweilige Mehreinstellung einiger Beamten" bei den Genossenschaftsbureaus überwinden zu können, als vielmehr darauf, dass bei einer Zersplitterung der lohnstatistischen Zusammenstellungsarbeiten durch Überweisung an die einzelnen Genossenschaftsbureaus jegliche Gewähr dafür verloren geht, dass diese Arbeiten mit der erforderlichen Gleichmässigkeit und Zuverlässigkeit besorgt werden. Hier kann zeitweilige Beamteneinstellung bei den einzelnen Genossenschaftsbureaus in keiner Weise genügen; es ist vielmehr eine dauernde staatliche Organisation zur Verarbeitung des fraglichen sozialstatistischen Urmaterials nöthig; solche ist geboten in der Schaffung einer statistischen Abtheilung eines staatlichen Arbeitsamtes, was nicht ausschliesst, dass die Centralisation dieser Arbeit in Deutschland mit Rücksicht auf den schon vorhandenen Bestand eines mit den Berufsgenossenschaften in ständiger Fühlung stehenden Organes, nämlich des Reichsversicherungsamtes bei diesem, und falls solches unerreichbar sein und auch ein besonderes Arbeitsamt mit statistischer Abtheilung nicht gegründet werden sollte, mit dem kaiserlichen statistischen Amte verbunden würde.

Anlage.

Firma (Name) der Betriebsinhaber _____

VERZEICHNIS der ARBEITSLÖHNE

Laufende No. der Arbeiter.	1.				2.			
Namen der Arbeiter.								
Art der Beschäftigung (thunlichst speziell anzugeben).								
Geschlecht, nicht zutreffendes zu durchstreichen.	männl. weibl.				männl. weibl.			
Alter.								
Woche des Jahres 189 .	Arbeitstage.	Gesammt-Zahl der Arbeitsstunden.	Verdienter Lohn (Accordlohn z. unterstreichen).		Arbeitstage.	Gesammt-Zahl der Arbeitsstunden.	Verdienter Lohn (Accordlohn z. unterstreichen).	
			M.	Pf.			M.	Pf.
1. vom 1/1. bis - - -								
2. „ „ - - -								
3. „ „ - - - -								
4. „ „ - - - -								
5. „ „ - - - -								
6. „ „ - - - -								
7. „ „ - - - -								
8. „ „ - - - -								
9. „ „ - - - -								
10. „ „ - - - -								
11. „ „ - - - -								
12. „ „ - - - -								
13. „ „ - - - -								
14. „ „ - - - -								
15. „ „ - - - -								
16. „ „ - - - -								
17. „ „ - - - -								
18. „ „ - - - -								
19. „ „ - - - -								
20. „ „ - - - -								
21. „ „ - - - -								
22. „ „ - - - -								
23. „ „ - - - -								
24. „ „ - - - -								
25. „ „ - - - -								
26. „ „ - - - -								
27. „ „ - - - -								
28. „ „ - - - -								
29. „ „ - - - -								
30. „ „ - - - -								
31. „ „ - - - -								
32. „ „ - - - -								
33. „ „ - - - -								
34. „ „ - - - -								
35. „ „ - - - -								
36. „ „ - - - -								
37. „ „ - - - -								
38. „ „ - - - -								
39. „ „ - - - -								
40. „ „ - - - -								
41. „ „ - - - -								
42. „ „ - - - -								
43. „ „ - - - -								
44. „ „ - - - -								
45. „ „ - - - -								
46. „ „ - - - -								
47. „ „ - - - -								
48. „ „ - - - -								
49. „ „ - - - -								
50. „ „ - - - -								
51. „ „ - - - -								
52. „ /12. „ 31/12. - - - -								
Wert von Naturalleistungen, Gratifikationen, Tantièmen etc.								
Summa -			—	—			—	—
Summa des Lohnes -	—	—			—	—		
Anzurechnender Lohn* -								

* Vom Unternehmer nicht auszufüllen.

Berufsgenossenschaft. Sektion No. _ .

_____ zu _____.

für das Jahr 189 _ _.

3.				4.				5.				6.			
männl. weibl.				männl. weibl.				männl. weibl.				männl. weibl.			
Arbeitstage.	Gesammt-Zahl der Arbeitsstunden.	Verdienter Lohn (Accordlohn z. unterstreichen).		Arbeitstage.	Gesammt-Zahl der Arbeitsstunden.	Verdienter Lohn (Accordlohn z. unterstreichen).		Arbeitstage.	Gesammt-Zahl der Arbeitsstunden.	Verdienter Lohn (Accordlohn z. unterstreichen).		Arbeitstage.	Gesammt-Zahl der Arbeitsstunden.	Verdienter Lohn (Accordlohn z. unterstreichen).	
		M.	Pf.			M.	Pf.			M.	Pf.			M.	Pf.
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

DISCUSSION.

Mr. David F. Schloss wished to point out that Englishmen make a mistake when they so readily admit that their country is behind the Continent in point of thrift and in regard to institutions established by employers for the benefit of their employés. Mr. Rowland Hamilton had shown what a vast amount of thrift exists; he had mentioned that the working men co-operators did a trade of 40,000,000*l.* a year. Mr. Schloss pointed out that out of this, however, 5,500,000*l.* related to goods manufactured in co-operative workshops; the general statement that English co-operators succeed only in distribution, while other nations, especially France, surpass us in co-operative production is quite incorrect. As to *institutions patronales*, these exist in great numbers in this country; a few examples were given, and Mr. Schloss said that if, in this respect, we are behind the Continent, this is greatly due to the existence of our strong trade unions, which do not like anything in the shape of deferred pay, and which do their best to cut down profits, so that our employers do not find themselves left with a very large margin for founding institutions for their workpeople.

Herr Herman Greulich (Zürich) sagte:—Ich spreche zu der Vorlage des Herrn Dr. G. von Mayr, und zwar erlaube ich mir, einige Zusätze zu beantragen. Es möchte auf den Nachweisen über Erkrankungen und Unfälle noch beigefügt werden der Nachweis über Lohn und Arbeitszeit, und die Frage, wie lange der Erkrankte oder vom Unfall Betroffene in seinem Beruf thätig ist.

Zu diesem Zusatz wurde ich namentlich durch die Diskussion über den ersten Punkt der Tagesordnung veranlasst. Es war mir bemühend, zu hören,—und zwar nicht ohne einige Berechtigung,—dass der heutige Stand der Erkrankungs- und Sterblichkeits- Statistik noch nicht allgemeine sichere Schlüsse in Bezug auf die Wirkung der Arbeitsweise und Arbeitszeit, sowie des Berufes erlauben. Gewiss ist die diesbezügliche Statistik noch nicht genug entwickelt, aber diese Erscheinung ist bemühend, wenn wir bedenken, dass es 36 Jahre her ist, seit auf dem internationalen statistischen Kongress in Brüssel 1851 Männer wie Ducpetiaux und Vischers in bewegten Worten die Nothwendigkeit der statistischen Untersuchung der Arbeiterverhältnisse darlegten. "Jam ardet Ucalegon!" Wahre dich, beim Nachbar brennt's! So rief Vischers dem Kongress zu. Und heute nach 36 Jahren können wir noch nicht mit Sicherheit die Wirkung der Arbeit auf die Erkrankung und Sterblichkeit nachweisen.

Wir können in der aus dem Material der Arbeiterversicherung erhobenen Statistik freilich nicht den Einzelnen nicht ingleicher Weise folgen, wie dies bei den Beobachtungen über die Kindersterblichkeit der Fall ist, aber doch ist es möglich, den Einfluss von Arbeit und Lohn auf Erkrangkung und Sterblichkeit zu ermitteln, wenn wir die oben bezeichneten Fragen dem Erhebungsformular beifügen.

Man hat Spezialforschungen, Monographien, als das Geeignetste erklärt, um über diese so wichtigen Fragen Klarheit zu erhalten. Gewiss bieten die Monographien ungemein werthvolle Aufschlüsse über singuläre Erscheinungen. Aber, einestheils würde es viel zu lange Zeit dauern, bis alle Berufsarten bearbeitet wären,—und so lange würden die murrenden Arbeiter nicht auf eine Verbesserung ihrer Verhältnisse warten,—anderntheils sind es nicht die speziellen, sondern die *allgemeinen* Uebelstände, derem Abhülfe in erster Linie dringend ist.

Indem ich beantrage, das Material der Arbeiterversicherung so ausgiebig als möglich, für die Sozialstatistik zu benützen, spreche ich nicht nur als Statistiker und im Interesse der Statistik, sondern auch als Vertreter der Arbeiter unsers Landes.

Dr. von Juraschek (Vienna) sagte:—Die Resolutionen des Herrn Dr. Mayr sind das Ergebniss sorgfältiger Forschung längerer Zeit und verlangen durch ihre Fragweite eine besonders eingehende Besprechung. Ich möchte daher einige Bemerkungen zu denselben machen. Nach dem, was wir heute bereits gehört haben, ist es wol nicht nötig noch besonders zu begründen, dass die Nachweisungen über den Beruf möglichst specialisirt werden. Ich schliesse mich daher dem Vorredner Dr. Greulich darin an, dass die Dauer der Zugehörigkeit zum Beruf nachgewiesen wird. Ich möchte aber auch die Stellung im Berufe und den eventuell vorher ausgeübten Beruf nachgewiesen haben. Bei der Grösse des Berufseinflusses auf die Gesundheit ist ferner nöthig *jeden* Beruf in Combination mit den Krankheiten zu betrachten, und ich möchte daher die Einschränkung auf, einige Haupt-Berufsgruppen ausschliessen. Ferner möchte ich aufmerksam machen, dass die demnächst auch hier zur Besprechung kommende Zählmaschine die Individualkarte als Zählungsform überflüssig macht, weshalb ich bloss "Individual-Nachweisungen" verlangen würde. Endlich ist, mit Rücksicht darauf, dass ein international gültiger Beschluss gefasst werden soll, und mit Rücksicht darauf, dass die Mitwirkung der Arbeiter und Unternehmer nothwendig sein wird, zu sagen, "Arbeitsamt" allein, und möchte ich hinzufügen, dass dieses Arbeiter und Unternehmer zur Mitwirkung bei der Aufnahme heranzuziehen hat. Ich beantrage daher:—

Motion

ad 1. (α) (page 221) soll lauten:

Die Versicherten sollen nachgewiesen werden nach Geschlecht, Alter, Civilstand, Beruf. "*Es ist* für die Aufarbeitung der Daten anzugeben " der gegenwärtige Beruf, die Dauer der Zugehörigkeit zu demselben " und eventuell der vorher ausgeübte Beruf, endlich die Stellung im " *Beruf*."

Es ist *wegzustreichen*:

" einigen Haupt-" (*zweimal*).

" Bei den hauptsächlichen " etc. bis " erwünscht."

Dafür unter

(β) Die einzelnen Krankheiten sollen nach "Alters- und Berufsgruppen" nachgewiesen werden.

B. " Es ist eine Individual-Nachweisung zu geben. Die Bearbeitung der Daten soll central bei einem Arbeitsamte erfolgen, welches die Arbeiter und Unternehmer zur Aufnahme der Daten heranziehen und bei Aufstellung der Individual-Nachweisung mitwirken soll."

Das Wort " Staatsanstalten " ist zu streichen.

Mr. P. M. Tait said, with regard to Mr. Rowland Hamilton's paper "Thrift," that all the figures on this subject had lately passed through his hands, and he had found that the obligations of insurance, friendly, and accident companies in this country might be roughly estimated at about one thousand million sterling.

The way, he imagined, to inculcate habits of thrift in the working man—at least one potent factor in such teaching—would be to give him examples of the rapidity with which money, over a long series of years, accumulated at compound interest. The largest company in the world

question of thrift he agreed very much with Mr. Schloss that, when fully understood, the forethought and self-denial of the English people entitled them to a high place among the nations. It was not understood, perhaps, because Englishmen were not given to bureaucracy or, indeed, to much organisation of any sort. Though they had among them the great "affiliated societies," as they were called, their friendly societies were mostly small, mostly local, having little fame beyond the small towns or considerable villages in which they existed, and their beneficial work in providing burial money (which was purely insurance) or sick pay, which constituted their chief functions, was, in consequence, very much obscured and overlooked. But the great movement which had of late filled the public mind was that of State insurance, of which Germany had given them the greatest example, combining, as it did, insurance against sickness, and accident, and death—which probably they, in England did voluntarily almost equally well—with provision for old age, which, on any great or organised scale, they scarcely did at all. Now, on this great German scheme, he would like to say a word. It had lately been subjected to the analysis and criticism of English actuaries, who had reluctantly come to the conclusion that the scheme was defective, and therefore dangerous—defective because based on insufficient or untrustworthy data, and dangerous in that it failed, in consequence, to estimate aright the stupendous financial burdens which, in days to come, it would inevitably entail. The desire to imitate Germany in respect of providing deferred pay or pension, and so to diminish or remove the stain of pauperism which so largely prevailed, had taken great hold of the minds of Englishmen. It had ceased to be the property of philanthropists. Experts and practical statesmen like Mr. Chamberlain, men of clear vision and resolute purpose, were engaged upon it, and had already taken it out of the region of sentimentalism, and were fast giving it form and reality. The difficulty was the question of compulsion. Though much might be done by the favourite device of Englishmen, voluntaryism, a scheme of this kind could obtain universality only by compulsion, and for compulsion Englishmen were not yet ripe. A form of compulsion of a novel and striking character had been suggested by a prominent and highly cultured English actuary when under examination before a Committee of the House of Commons. He suggested that every man should be entitled to a deferred pension of a minimum amount on attaining a specified age, and that the burden of providing it should fall, as other national burdens fall, on the national Exchequer. The burden would then be borne by those best able to bear it. Those who did not, and would not, take the pension, would ease the burden to others, who would, besides, escape other burdens for poor rates and the like, which now oppressed them. The idea would repay examination, but whether, by this means or another, they, in England, solved the problem, they would have to do it for themselves, for, greatly as they respected the motives, and admired the bold directness of their German friends, they, the English actuaries, did not think that the problem had been satisfactorily solved by Germany.

The Protection of Workmen in Factories, and its Promotion by Museums of Industrial Hygiene.

BY

Dr. MIGERKA, Chief Sanitary Inspector of Factories, Vienna.

The working of factories compels us to take into account two facts:

(1.) The increased danger to workmen arising from the co-operation of machinery;

(2.) The injuries to health arising partly from the construction of the factories, partly from the materials employed or from the processes of manufacture.

Accidents to workmen which occur in manufacturing and which we may consider cause sudden injury to their working capacity, such as pressure, blows, strains, falls, etc., move in a long row of many links from a light contusion to sudden extinction.

"Careful attention" may be noted as an infallible protection in many cases. That this can largely prevent accidents is without doubt; but owing to the variety of accompanying circumstances, it cannot be accepted as a never failing preventive. If we endeavour to realise the monotony of many modes of working, often consisting only in unceasing attention to machinery, especially under the influence of long hours of labour, or of a fatiguing bodily position, or of an atmosphere filled with vapours, dust, etc.; if we further endeavour to realise the lassitude caused by bodily weariness or by mental indisposition or the effect of haste induced by piecework; if we finally consider that only one moment of inattention is sufficient to cause an accident; then we must acknowledge that in the long run, and even under normal conditions, the vaunted sole preventive of danger to the security of life—"careful attention"—must fail.

But have we not also to reckon upon carelessness, wilfulness, foolhardiness, and, despite of all preventive measures, is not ignorance of danger also too often worthy of consideration?

Let figures speak. According to the statistics published by the Imperial German Assurance Office, in the case of 64 industrial associations, we find that among 10,000 insured persons there were 290 cases of accidents, 29 cases of permanent disablement, and seven cases of death. Of the whole number of insured persons, there are enumerated as having been robbed of their bread-winner 1,500 widows, 4,697 children and 212 parents. No doubt assurance against accident decreases the material injury caused; considering, however, the decreased working capacity of so many persons, considering the misery caused by the loss of a member of the family, considering finally the irretrievable loss to society caused by such calamities, the conclusion may be accepted that prevention of accident is better than assurance against accident.

The weight of this conclusion compels the unavoidable demand for sufficiently effectual means to prevent the chances of accidents. We are, no doubt, here confronted with an impediment not to be undervalued, viz., that the means of prevention in some cases is difficult, and in other cases is expensive; but do not the wonderful achievements of technical science in industrial fields justify the assumption of equal accomplishment in the department of protection for workmen?

In fact we have to record, although these efforts were only inaugurated a few years ago, an encouraging and gratifying result of the same in a reduction of the accidents arising from certain sources of danger.

As to the other mentioned cause, it is unhappily equally indisputable that an impractically built and non-spacious factory on the one hand, and the raw or accessory material in work on the other hand, together with the temperatures required by the process of manufacture (too much dryness or moisture of the workroom, generation of vapours, dust, etc.), slowly undermine the health of those working under these internal conditions, more and more lower their working capacity and prepare a premature end for those who are exposed to the invidious attacks of these conditions.

In consideration of the individual and social value of such objects as the preservation of human working power and of individual life, it appears certainly a moral duty and a commandment of prudence to devote our full attention to the combating of these evils.

Inspired by human care, modern legislation protects children, young persons and women. But has not also the adult a right of protection against the injuries to his health by causes over which he has no control, and under the influence of which he falls into sickness and hastens his own untimely end?

With renewed courage we can, on account of the already accomplished results, designate the demands put forth by science as realisable; technical science shows itself capable of solving even these problems; the humanely minded manufacturer is willing to make sacrifices, an enlightened legislature knows how to bend the will of the ill-disposed, and society completes the activity of the State by associations willing to give their support.

The governing and directing influence in the management given by the organisation of the associations of manufacturers naturally increases the zeal of those circles in the first instance interested, strengthens their confidence in the matter, and augments their power of management. The form of an association, more than any other form of organisation, guarantees the assistance of men belonging to different callings, which is always so desirable.

I gladly mention by name "The Association for the Promotion of the Museum for Industrial Hygiene at Vienna," as one which, notwithstanding its youth, its statute only dating from 31st October, 1889, may congratulate itself in having spread and intensified in the circles of employers, as well as of labourers, both knowledge and interest in attempts to attain the greatest possible security against perils of life and health in the working and management of a factory.

diminish them, appears worthy of welcome and general application as a reform benefitting society at large.

An enlightened conception of the reasonable development of society demands, that, with a competition in production which tends to individual profit, may be found side by side a competition, so useful for mankind in general, in combating the perils of manufacturing processes.

Réduction de la Mortalité des grandes Cités: Application à Barcelone.

PAR

Senor P. Garcia Faria, Barcelona.

Les conquêtes démographiques s'obtiennent par l'ensemble des renseignements individuels et la somme des conséquences que la statistique déduit de l'étude d'une cité à l'autre. Comme notre travail relatif à Barcelone corrobora les observations qui découlent de l'étude d'autres cités, par rapport à la moindre insalubrité des zones bien urbanisées à celles qui offrent des défauts graves; et parceque nous croyons que la réalisation des réformes sanitaires projetées à Barcelone feront ressortir les excellentes conditions naturelles qu'elle réunit, c'est pour ce motif que nous présentons son état statistico-démographique au moyen de tableaux et de tracés graphiques qui le rendront palpable, jour par jour, pendant la décade 1880–89, et maladie par maladie, dans la totalité en Barcelone.

Dans l'état actuel des connaissances, il est impossible que l'hygiéniste ait une jurisdiction limitée et sirconscrite pour développer ses idées; aujourd'hui le champ de l'hygiène est le monde entier, et universels sont les moyens et les études qu'il peut employer pour corroborer ses humanitaires résultats: Parceque le médecin fait de l'hygiène non seulement quand il indique les réformes qu'on devra introduire dans la demeure d'une famille; de l'hygiène font l'ingénieur et l'architecte dans leurs projets d'assainissement des villes, des champs, des constructions de maisons et d'hôpitaux, etc., etc.; de l'hygiène font aussi le sacerdote et le moraliste en combattant les vices et l'immoralité; et de même aussi devront la practiquer l'industriel et le militaire, et tous les hommes en leurs professions et métiers respectifs, aussi bien que la femme dans l'enceinte aimée du foyer domestique.

Possibilité d'éviter les Maladies.

L'existence de l'homme est composée de deux éléments, l'esprit et la matière. Le développement de cette dernière est, dans la partie matérielle,—comme tout ce qui est créé,—sujet à des lois déterminées qui peuvent être influencées par celles qui régissent les maladies, ces accidents étranges de la vie, dont l'action loin d'être fatale et indispensable, l'homme peut les éluder et doit les éviter.

La maladie est une altération du fonctionnement du corps humain, lequel est constitué d'une multitude d'organes qui ont chacun une mission propre, impossible de substituer par autres, de la même manière qu'une machine bien ordonnée et bien proportionnée les a. (Voir l'annexe No. 1.) Dans l'un et l'autre cas la marche de l'ensemble est régulière et complétement normale, jusqu'au jour où une cause intrinsique ou extrinséque occasionne une alteration dans ledit fonctionnement et fait qu'un ou plussieurs organes présentent une irrégularité en son régime d'être et éveillent l'attention qui, antérieurement n'en méritait aucune, si ce n'est l'admirable disposition de l'ensemble.

Dans la supposition, la plus favorable, que rien ne soit altéré par aucune des causes mentionnées, elle suivra constamment sa marche, jusqu'à ce que la force motrice dont elle est capable vienne à cesser, et dans ce cas qui, pour l'homme, est celui de la mort par sénilité, l'être a donc développé toute la vitalité dont il est susceptible.

Cette fin heureuse n'arrive que difficilement, car elle a trait à la longévité, mais cela est dû à plusieurs causes, motivées généralement par l'homme lui-même et que celui-ci devrait toujours éviter.

Qu'on ne croit pas cependant qu'il soit possible de prolonger d'égale manière la vie de tous les hommes ni que celle-ci puisse se dilater un seul moment de plus que celui qui correspond, comme maximum, à la force vitale que reçoit l'enfant au moment de naître. Au contraire, au sortir du cloître maternel, il se trouve en des conditions déterminées qu'influiront sur celles qu'aura l'être une fois dans le monde ; les conditions héréditaires que les fils reçoivent de leurs pères sont cause de l'état que nous relatons, et plus ces conditions seront incomplètes, plus courte sera la longévité que pourra atteindre le nouveau-né. Nonobstant les maladies héréditaires elles-mêmes peuvent s'éviter ou se soulager en contrariant ou annulant les prédispositions morbeuses de l'organisme, mais non ajouter à cette vitalité, considérant comme limite maxima de l'existence, celle qui correspond à la force initiale à l'épogue de la naissance, développée après dans les conditions les plus favorables.

Dès que le nouvel organisme a sa vie propre, il subit dans son évolution mondaine diverses phases qui font que sa vitalité se démontre à l'extérieur sous forme sensible et croissante et d'une manière continuelle (s'il jouit toujours de bonne santé), jusqu'à arriver à l'apogée qui, dépassée, décroît aussi continuellement jusqu'à s'éteindre complètement avec la cessation de l'existence. Celle-ci s'approchera d'autant plus du point de départ que la vitalité sera plus petite, et que sera plus éloigné la constitution d'organes quelconques de celle qui correspond à son fonctionnement, réduisant toujours ces différences la longévité de l'être à sa limite maxima, de laquelle il peut se rapprocher sans jamais la dépasser, vie qui sera d'autant plus longue, (dans cette limité) qu'on aura mieux combattu l'inclination de la partie défectueuse au profit d'un traitement judicieux et de la rénovation des mollécules ; et d'autre part, quand plus petites auront été les résistances étrangères ou causes morbeuses qui diminuent sa force vitale.

Les résultats obtenus par la gymnastique et l'orthopédie démontrent qu'on peut modifier avec profit les défauts de conformation de plusieurs

organes sujets à influences externes, même dans le cas le plus défavorable où ces défauts proviendraient, soit de la génération, soit de la vie intro-utérine de l'enfant ; de la même manière on peut améliorer, dans ces cas, la constitution de l'être dont nous parlons.

Le premier moyen de corriger les maladies appellées héréditaires consiste en empêcher les contrayants de les prendre et faire en sorte que ne s'unissent point des individus dont l'union puisse produire des êtres defectueux à cause de leur consanguinité, ou, pour leur être communs des défauts graves. Si l'opinion des docteurs se faisait sentir dans le choix ou élection des consorts, les fils seraient indudable-ment plus sains et de longévité plus grande que celle de beaucoup de ménages actuels, et, par cause, on devrait présenter certification favorable du médecin pour pouvoir se marier.

Nul ne doute que l'hygiéniste et le médecin peuvent modifier les conditions d'un enfant ayant une prédisposition marquée d'acquérir telle ou telle maladie quand son organisme contracte certains défauts ou acquiert les propriétés de réceptibilité et de cultivation d'un germe déterminé, comme par exemple, celui de la tuberculeuse. Dans ce cas, le germe se développera autant qu'il le pourra dans les éléments appropriés à son évolution, mais le mal cesserait encore, en supposant qu'il ait commencé, en quittant au sang ou au terrain où ce mal opère quelqu'uns des éléments absolument indispensables à l'évolution énoncée, et la même chose arrive avec les différentes altérations du fonctionnement du corps humain.

Si nous disons cela des maladies héréditaires et de génération qui semblent être des plus difficiles à combattre, nous le redirons avec plus de raison en ce qui concerne les autres maladies, et, à cet effet, nous citerons quelques exemples de causes de mortalité de bien différentes catégories. Dans les accidents expontanés figurent la fulguration et la asphixie en des lieux liquides, mais l'hygiène dispose de moyens comme les paratonnerres bateaux de sauvetage etc., qui peuvent éviter fréquemment ces accidents ou sinon diminuer leurs conséquences et leur gravité.

Comme accidents provoqués par causes de nature bis-dynamique se trouvent les homicides, les disgrâces sur la voie publique, les agressions des fauves, etc., etc., qui peuvent s'empêcher en instruisant les hommes, séparant convenablement la circulation pédestre de la roulante, que l'on doit réglementer et aider l'homme au moyen d'organismes sociaux qui protègent sa vie.

On compte aussi entre les causes mécaniques de mortalité d'origine physique, les accidents physio-pathologiques, comme l'inflammation du canal digestif, qui peut s'eviter par un régime bromathologique ordonne et salutaire, prevénant les abus en quantité et qualité des mangers et des boissons.

Entreprenant l'étude des maladies dont les causes mécaniq sont d'origine chimique, nous trouvons les anto-intoxications c l'urémie (empoisonnement produit par la présence de l'ur expulsée du sang par l'appareil rénal), laquelle peut s'éviter

bon régime diabétique, qui favorise la formation de l'urine dans les reins.

Plus évidente encore est notre assertion en parlant de la branche très-importante des maladies infectieuses et contagieuses, et toutes celles qui sont transmissibles; celles-là sont les plus certainement évitables, car sans l'existence du germe, il n'y a pas de maladie; donc les travaux d'assainissement, les vaccinations préventives, en un mot, les procédés les plus généralement recommandés par l'hygiène sont les plus designés parcequ'ils constituent la véritable solution du problème.

Entre les distrophies les maladies pour causes peu connues, nous citerons le raclutisme, l'anémie, etc., etc., que se combattent en excitant les forces de l'individu et en lui proportionnant les aliments et l'air propres à réparer les pertes de ses organes ou de son système.

Enfin nous examinerons les intoxications accidentelles et habituelles comme la intoxication saturnienne, l'alcoolisme, etc. qu'on empêche parfaitement en mettant en vigueur une législation sévère qui protège la vie de ceux qui l'employent dans les industries insalubres propageant l'instruction et la moralité qui sont le grand moyen de corriger les erreurs et de combattre les intempérances; prohibant l'emploi de certains alcools et autres boissons d'industrie plus ou moins toxiques.

Ces indications ne paraîtront peut-être pas faciles à appliquer aux autres maladies multiples pour lesquelles le fait ne semble pas si évident; cela est dû au retard que, sur ce point, est l'hygiène, dont les progrès iront parallèment, faisant décroître le nombre des maladies tenues pour inévitables.

Ainsi parle Proust et d'autres hygiénistes éminents, les quels certifient que le nombre des maladies tenues pour évitables croît a mesure que se développe cette utile science.

John Simon, en 1858, étudia avec grande attention la mortalité qui sévit en Angleterre et déduisit que le plus grande nombre de maladies qui produisit cette mortalité, étaient évitables, mais à cause de l'état où se trouvaient les connaissances hygiéniques, il considéra comme inévitables: les déformations, la débilité native, les accidents, les maladies contagieuses des enfants, les maladies qui procèdent de la misère et les héréditaires.

En commentant ce travail, Arnould dit fort bien que les maladies des enfants ne diffèrent, à ce point de vue, de celles des adultes qui, précisément, sont très évitables par la désinfection et l'isolement. Le savant hygiéniste ajoute après que les influences héréditaires n'agissent pas toujours fatalement, et que nous disposons de moyens à propos pour lutter contre les tendances morbides, pouvant les combattre des leur commencement, empêchant ainsi le développement de la maladie héréditaire.

Quant à la tuberculeuse, la plus terrible des maladies dont souffre l'humanité, Buchanan en Angleterre, et Bowditch en Amérique, ont fait sur elle des notables études, desquelles on a déduit que cette maladie diminue extraordinairement avec les travaux d'assainissement. Comme fait notable et décisif nous citerons la complète transfor-

mation opérée en plusieurs villes anglaises qui, au moyen d'ouvrages d'assainissement réalisés, ont réduit la mortalité à la limite de 12 à 14 pour 1,000, faits consignés dans le rapport rédigé par la Commission chargée de l'étude de l'assainissement de Turin, dans lequel on trouve aussi que Frankfort à réduit sa mortalité de typhoïde de 11 à 13 pour 100,000. Berlin de 6 à 8 et Munich, et autres aussi châticés par leurs épidémies, de 1 à 7.

Arnould, faisant d'adroites considérations sur la possibilité d'éviter les maladies contagieuses, dit avec une notable prévision, qu'un jour viendra où les nations illustrées chatieront et poursuivront judicairement tout ceux qui auront été la cause ou l'origine d'un foyer épidémique.

Succint examen de Barcelone.

Prochaine la complète transformation de Barcelone, en vertu de la récente concession de sa réforme et du projet d'assainissement du sous-sol, travaux qui compléteront ceux de son superbe agrandissement, il nous semble que cette époque est la plus à propos si nous voulons connaître ses actuelles conditions d'insalubrité moindres, dans leur ensemble, que celles de Marseille, et aussi pour y étudier plus tard l'effet des réformes radicales qui vont être faites et dont l'exécution sera immédiate.

Il y a peu de pays en Europe où, comme dans la nôtre, il soit si difficile d'entreprendre une étude de statistique et de démographie sanitaire pour bien des circonstances, surtout par le défaut de précision et de d'exactitude avec lequel ou prend les notes de statistique qui se publient, et de là ivient probablement la cause primordiale de ne pas utiliser la statistique dans la proportion qui correspond à cette très-importante partie des sciences biologiques, dans laquelle les autres sciences ont leur naissance et leur point de départ.

Pour ce motif, et présentant un travail basé sur la statistique et destiné à l'étude de la réduction de l'excessive mortalité de notre ville comme à la démonstration de la possibilité d'éviter une multitude de maladies, il se présente de nombreux inconvénients qui ont une importance certaine et peuvent être encore la cause de beaucoup d'erreurs involontaires ou omissions qui disparaîtront à mesure du perfectionement de la statistique.

En pénétrant dans le vaste champ de la prophilaxie des maladies qui, en Espagne, n'est du domaine d'aucune classe professante, nous le le faisons animé par les phrases de l'éminent Pettenkofer, le savant médecin de Munich qui, dans le sexième Congrès international de Science, disait avec grande raison : que les moyens propres à éviter les maladies évitables, et spécialement les épidémies, n'étaient pas du domaine de la thérapeutique, mais principalement de l'art de l'ingénieur et du gouvernant.

De plus, la seule espérance qui nous guide, est de croire, que si nous arrivons à contribuer en petite échelle, il est vrai, au progrès de l'hygiène publique de Barcelone, nous lui aurons prêté le plus grand service dont nous sommes capable, et si, au contraire, nous nous heurtions à la grandeur du problème, les erreurs dans lesquelles nous tomberio

enseigneraient aux autres, plus fortunés que nous, la voie à suivre
découvrir la vérité, car c'est seulement ainsi que progressent les scie
dans le chemin difficile de cette vérité, d'une façon semblable au c
d'une rivière dont les eaux vont choquant de l'une à l'autre rive, des
dant cependant, et gagnant du chemin dans la direction de l'embouch
pour, bientôt, se confondre dans le réceptacle irrépuisable où appor
leur contingent tous les autres cours d'eau.

L'étude de la mortalité relative à chacune des rues de Barce
pendant la période de 1880 à 1889 inclusivement, révèle que
quantité augmente à mesure que les conditions d'urbanisation de la
et des îlots de maisons sont plus mauvaises. Pour le prouver, examin
seulement les états, Modèle No. 6 dans lesquels les rues sont insc
selon l'ordre de leur plus grande mortalité relative. Il résulte de
examen que des 288 rues qui l'ont supérieure à 30 pour 1,000, où,
entre toutes, celles les plus extraordinairement insalubres, il n'en est
une qui rennisse les plus médiocres conditions d'urbanisation ; beauc
sont privées d'elles, manquant complètement d'égouts, de pavage,
canalisations d'eaux ; enfin en leur immense majorité, l'égoût
détestable, on fait défaut dans le reste. De toutes les rues aux quell
trait l'état dont nous parlons, aucune n'avait un bon pavage, é
mauvais même celui de la généralite, des rues ; quelques unes avec
MacAdam, tandis que d'autres manquaient complètement de revêteme

Les demeures de ces rues sont conséquemment très-malsaine
parmi les habitations contaminées dominent celles qui sont exem
de ventilation, avec une densité énorme d'êtres humains, manquant d'
dotation d'eau potable suffisante, usant de moyens d'expulsion d'ex
ments véritablement affreuse, car elles ont des dépôts d'ordures dégoût
au dessous de l'évier ; la cuisine sans air, ou dans les mauvaises conditi
avec les lieux d'aisances au dedans et, dans certaines maisons, san
siphon obturateur. Les dépôts de latrines se trouvent sous le ramp
des escaliers, et d'autres, comme dans la Barcelonette, sous les trott
La largeur des rues a une grande influence, et nous voyons qu'entr
288 rues et places dont nous parlons, 13 seulement sont d'une larg
régulière qui atteint un dépasse de 20 m., et cependant elles sont
des conditions particulières puisqu'elles manquent d'urbanisation
réunissent de si mauvaises conditions qu'elles suffisent à expliquer l'e
de mortalité.

Pour pouvoir entreprendre avec quelque précision l'étude dé
grafico-sanitaire de Barcelone, nous avons choisi la dernière diz
d'années écoulées, soit de 1880 à 1889, parceque les renseigneme
consignés dans les feeuilles de décès, comme dans le récensement du
Janvier de 1888 y sont plus complets. Des documents rédigés jus
nos jours, en deux derniers sont ceux qui nous méritent le plus gr
crédit, parce qu'ils nous démontrent une plus grande exactitude.

De ces reseignements et de ceux que nous avons recueillis, il rés
que la mortalité absolue est en moyenne de 8,892 individus par a
compris les avortements, et 8,425 sans eux, la population étant s
le récensement du 1er Janvier de 1888, de 272,481 et de 300,00
minimum que correspond réellement au terme municipal de Barcelo

la mortalité relative est de 30·92 pour 1,000 selon le récensement et de 28·88 pour 1,000 le maximum véritable, qui est près de cette que nous considérerons plus bas, tenant en compte que dans ces chiffres ne sont pas inclus ceux qui correspondent aux avortements.

Nous pouvons assurer que la mortalité de Barcelone n'excède pas comme moyenne annuelle de 28·5 pour 1,000; mais enfin, malgré cela, ce chiffre est trop élevé et peut certainement se réduire en 10 pour 1,000 par an, et cela éviterait ou retarderait la mort d'unes 3,000 personnes qui succombent bien à tort, et permettrait à la plupart de prolonger l'âge moyen de leur vie.

En étudiant la marche de la mortalité totale dans les diverses époques de la période indiquée, nous observons que les maximums correspondent toujours à l'époque hivernale et spécialement au mois de Janvier, et puis aux mois de Décembre et de Février, décroissant toujours au printemps, ayant généralement son minimum dans le mois de Septembre et comme ensemble dans la saison d'été. (Voir anex No. 2.)

L'année de la plus grande mortalité fût celle de 1885 celui du choléra où l'on enregistra 9,805 décès et la minima celle de 1881 où il n'y êeut que 7,338 décès. La première année correspond à l'époque de l'épidemie cholérique, et l'on nota comme cela a lieu ordinairement, qu'après une année d'épidémie suit une autre dont la mortalité est moindre. Cela s'explique, parcequ'en ces années là périssent les malades les plus délicats.

Les décès abondent toujours dans les rues étroites, tortueuses, dans celles qui sont sans issue; dans celles enfin qui, pour ces divers motifs, offrent de graves défauts de ventilation et de clarté.

Passant à un autre ordre d'idées, on remarque que la mortalité est influencée, par la conduite ou moralité des habitants, puisque tous ceux des rues où abonde la gente vicieuse figurent en première ligne avec une mortalité très-grande, bien que les prostitues qui donnent un si grand contingent aux décès occasionnés par des maladies syphilitiques et tuberculeuses vont généralement achever leurs jours dans quelque nosocome, diminuant ainsi le contingent apparent de la rue où elles vivaient et dans lesquelles elles ne figurent plus.

L'augmentation de la mortalité coïncide aussi avec le défaut de position social, car les classes pauvres exemptes de moyens de fortune se voient dans la nécessité d'habiter des maisons moins chères qui, d'ordinaire, réunissent les plus mauvaises conditions, manquant d'eau, et par consequént de propreté, ainsi que de beaucoup d'éléments indispensables pour la vie et l'hygiène du foyer domestique, et surtout de l'air qui se vicie, dans la demeure. Il résulte de l'étude faite par l'éminent Ingénieur Cerdá de la population ouvrière de Barcelone qu'entre les individus de différentes positions, mais disposant d'un égal cube l'air respirable, la mortalité est proportionnelle à la valeur de leur position sociale, parceque la vie tranquille et méthodique des personnes de basse condition s'adapte mieux aux prescriptions hygiéniques que celles des familles à l'aise, ce que démontre la nécessité de construire maisons pour les ouvriers.

Pour connaître l'influence de l'orientation, l'illustre Ing
Cerdà étudia celle qui pouvait convenir à Barcelone pour le tra
lignes ou axes primordiaux de son projet d'agrandissement de la
déduisant de ses minutieuses études statistiques que dans les
dirigées vers les quatre points cardinaux la mortalité était plus g
que dans celles tracées dans une direction moyenne, qui furent
qu'il adopta à la fin. Il déduisit de la même étude qu'en
circonstances la mortalité est plus grande dans les rues périm
que dans les centrales, et qu'en supposant une égalité de c
stances la mortalité croît aussi en raison de la distance au cent
l'activité.

Enfin à ne considérer que la mortalité relative à toute la d
nous verrons que toutes les maladies endémiques, comme les
démiques, s'acharnent toujours sur les mêmes rues, et, de là, la
renommée qu'ont acquise les rues del Mediodia, de San Ramo
Ancells, de Amalia, de las Oncellas, de Salvadors, de Arco del T
enfin les rues insalubres, les tortueuses, les étroites, celles qui ont
maisons contaminées ou qui sont voisines de certains nosocome
d'établissements collectifs.

Entrant maintenant dans l'étude détaillé de la mortalité,
observons que les maladies qui originent le plus de décès
précisément les plus facilement évitables, de sorte qu'on po
empêcher ou retarder la mort de la plupart des gens qui décèd
Barcelone; pour le prouver nous inchivrons le présent tableau r
au période de 1880–89 :

Désignation des Maladies.	Mortalité total.	Relation de décès par rapport au total.	Désignation des Maladies.	Mortalité total.	Rela de par r au
			Reporté - -	44,870	0·5
Tuberculeuses - -	10,273	0·11576	Rougéole - -	3,088	0·0
Gastro-enteropathies -	7,629	0·08580	Diphtère - -	2,881	0·0
Pneumonies - -	6,128	0·06892	Petite vérole - -	2,203	0·0
Cardiopathies - -	6,020	0·06770	Choléra - -	1,694	0·0
Bronchites - -	5,156	0·05799	Coqueluche - -	330	0·0
Apoplexies - -	4,908	0·05520	Scarlatine - -	203	0·0
Fièvres typhoïdes -	4,736	0·05326	Maladies diverses -	33,650	0·3
	44,870	0·50463	Total -	88,919	1·0

La maladie qui offre le plus grande contingent de mortalité e
tuberculeuse. Dans notre cité, comme dans presque toutes les gra
villes, il semble que l'homme s'évertue à faciliter sa propre destruc
par ses ennemis les plus rédoutables, qui sont ceux du monde i
sible. Les trois maladies pulmonaires les plus importantes qui so
tuberculeuse, la pneumonie et la bronchite, d'espèces généralen
infectieuses ont produit un total de 21,577 décès auquels corresp
une proportion de 24·27 pour 100, ou soit le $\frac{1}{4}$ du total

morts. Ces maladies sont généralement évitables, et cela doit servir de stimulant pour mettre en seuvre les moyens indispensables de les corriger.

On observe, d'une part, que les rues où les maisons contaminées ont une grande densité de population, paient un énorme tribut à la mort par la tuberculeuse, et figurent en un lieu tristement célèbre les rues du "Mediodia (112·2), Cid (108·23), Sta. Madrona (85·94), " Vermell (78·25), Tigre (68·09), San Geromino (64·04), Salvadors " (63·07), Amalia (60·92), Robador (45·69), Cirés (58·50), Poniente " (43·54), et Arco del Teatro (70·20)." *

Le Dr. Fin attribue l'énorme mortalité occassioné par la tuberculeuse en notre ville à l'alimentation défectueuse et au manque d'habitations réunissant les conditions que l'hygiène réclame, car les rues de la vieille Barcelone, sont extrêmement étroites, avec des édifices excessivement élévés, et une population par trop dense, défauts qui se répareront avec la réforme de cette partie de la ville qui doit commencer cette année même.

Il faut noter la prépondérance de la tuberculeuse dans toutes ces rues, qui, comme celles dn Mediodia, Areo del Teatro, Alba, Monserrate et autres sont connues pour héberger en elles des gens de conduite vicieuse et dissolue qui, en plus de produire une extraordinaire dépense de leur organisme, le prédisposent à acquérir des maladies transmissibles de toutes espèces, et en particulier la tuberculeuse.

Semblables résultats se déduient des diverses maladies dans les quelles influent défavorablement les mauvaises conditions de la partie peu urbanisée de Barcelone, notant, au contraire, que là où les preceptes de l'hygiène publique ont été appliqués, une partie des influences morbeuses a disparu, encore qu'on n'en peut soustraire complètement Barcelone, jusqu'à ce qu'on ne pratique sérieusement l'isolement des attaqués de maladies infectieuses, la désinfection, et surtout pendant que l'assainissement de la ville et de la plaine du Llobregat ne soit complète.

Considérant Barcelone sous l'aspect moral, nous pouvons consigner que, sans être un modèle à tous les points de vue, elle réunit des conditions meilleures que d'autres grandes capitales où les vices dominent d'une manière complète ; ainsi, par exemple, la mortalité par la syphilis et alcoolisme, qui sont les deux fins fatales de la généralité de la gent vicieuse, donne seulement un contingent de mortalité annuel respectif de 48 et 23 décès par au auxquels correspondent les autres relatifs de 16 et 7·7 pour 100,000 habitants.

Il se déduit de tout ce qui a été exposé, que l'intime relation qu'il y a entre la mortalité et la situation des services urbains de la partie de la population que nous considérons, en lui quitant, au moyen de ces services les conditions inhérentes au développement d'une infinité de maladies évitables, qui disparaîtront aussitôt qu'on exécutera les réformes sanitaires si nécessaires à Barcelone, et qui doivent se développer brèvement, car les principales ont été approuvées par la corporation municipale. Quand ces réformes se seront réalisées, ou pourra comparer

* Ces renseignements sont ceux de la mortalité anuelle relative à 1,000 habitants.

la statistique démographique d'alors avec celle que nous présentons aujourd'hui, et nous avons la certitude qu'on pourra considérer Barcelone comme une des villes les plus saines du monde. Nous fondons notre croyance en ce que toutes les causes d'insalubrité qu'elle réunit sont artificielles et dûes à l'homme seulement, car bien que ces causes accusent leur existence, il y a quelques îlots de maisons où la mortalité n'est seulement que de 13 pour 1,000.

Annexe No. 1.

La Vie humaine.

La vie de l'être humain nous apparaît comme un acte résultant de l'ensemble des efforts des divers organes; lorsque nous jouissons de la santé, cet ensemble est harmonique et équilibré; quand il cesse de l'être, c'est-à-dire, quand il rompt le fonctionnalisme régulier du corps, la maladie apparaît.

Considérant que la maladie a pour effet de diminuer ou d'altérer les conditions vitales de l'organisme humain, nous pourrions la définir comme une réduction ou altération de la loi ou courbé de la vie, pour causes inhérentes ou extérieures à l'organisme.

Du moment où nous considérons la vie, non en son essence intime, mais en son expression sensible et externe, elle entre par cela même dans l'ordre des phénomènes naturels, qui tous son sujets à des lois plus ou moins difficiles de formuler, mais existantes sans doute aucune.

Dans le cas présent, la difficulté s'impose, car jusqu'ici on n'a pas trouvé le moyen de mesures le degré de vitalité d'un individu; mais quoique cette loi ne soit pas encore connue, peut-être la découvrira-t-on demain. De même que l'humanité a pu voir à chaque moment, quoique sans s'en rendre compte, les manifestations de la gravité et de l'attraction universelles; et même il y a peu d'années, nous ne pouvions soupçonner l'existence des dynamomêtres, des manomêtres et d'autres appareils mesureurs de forces; il est possible enfin que dans l'avenir quelqu'un découvre un procédé experimental capable de mesurer et d'évaluer la force vitale d'un individu dans les divers âges ou phases de son existence et dans ce cas tracer très facilement les points de la courbé correspondant à la formule de la vie et représenter géométriquement et analytiquement la loi de sa formation, dont l'existence est pour nous indudable; de même que nous sommes persuadés que cette loi se formulera malgré l'opinion d'auteurs illustres qui pensent être humainement impossible de déterminer l'équation générale de la vie.

Suivant l'ordre d'idées que nous venons d'exposer, nous rappellerons qu'un homme éminent, à plusieurs titres, un savant médecin catalan, le docteur Letamendi, a étudié le premier le mode de l'exprimer d'une manière générale par l'équation,

$$V = f(YC),$$

dans laquelle V est la résultante vie, Y la force individuelle et C la force cosmique, formule que répond à une différente idée de celle que nous guidera en pénétrant par le chemin méconnu de l'application du calcul

mathématique, à la réalisation de l'acte physiologique qui embrasse la évolution de l'organisme humain sur la terre.

Avant tout, et pour simplifier le problème, nous considérerons la vie de l'homme qui meurt de longévité, c'est-à-dire de mort naturelle et ayant usé convenablement et sans pertes diverses aucunes, toute la force vitale qu'il reçût au moment de naître; comparons pour un moment l'organisme à une machine perfectionnée capable de pouvoir donner sans perte aucune toute la force motrice de l'être humain, à toutes les époques de sa vie, et sans que des résistances étrangères réduisent sa valeur totale. Cela supposé, nous observerons que la vie humaine se manifeste d'une manière sensible par une force latente que possède, au moment de naître, le germe, et qu'en vertu de cet accroisement de dépense ou de consommation, cet être évolutionne jusqu'à perdre complètement cette force, de la même manière qu'une locomotive (représentation de l'être humain) sort de la station (cloître maternel) avec une certaine quantité de mouvements à développer, dépendant des formes, des matériaux employés, et de la disposition de la machine; une puissance à développer qui correspond à la vie, et dépendant de la perfection des organismes et de son ensemble, du soin de sa conversation; de l'arrangement de la machine; et des résistances qui tendent à la détruire. En plus de l'aptitude nécessaire pour que le mouvement subsiste, il faut encore user du calorique, au moyen des aliments pour l'homme, et du charbon pour la machine. On omet nécessairement le rechange des pièces défectueuses ou qui sont usées de la machine, car en pratiquant ce rechange on pourrait refaire par parties la machine et augmenter ainsi artificiellement sa durée, chose qui n'aura jamais lieu dans l'organisme humain. On entend donc par "vie" de la machine, sa durée maxima, sans avoir recours de renouvellement de ses pièces, mais sans cesser pourtant d'être l'objet d'une conservation complète et d'un soin particulier.

A l'instant du départ, c'est-à-dire, à la suite de la naissance (et nous pourrions dire à la suite de la génération) la machine marche avec lenteur, (de même que l'enfant n'est pas propre à une grande quantité de mouvements); la force vive accumulée en elle atteint alors son maximum et diminue à mesure de la durée de la marche (comme diminue la puissance assimilatrice ou l'affinité de l'élément cellule à mesure que l'âge de l'enfant augmente); plus tard le train suit sa marche acquiert la plus grande velocité, toujours au profit de la force vive accumulée en elle, et après être arrivée au maximum de sa puissance (âge viril) sa vélocité commence à décroître jusqu'à consommer la force vitale motrice on s'annuler complètement quand s'est dépensée, par l'influence des usures et des résistances soit la force vitale, soit l'aptitude qu'ont les mécanismes pour le mouvement, (c'est-à-dire la force vitale et la disposition des organes dans l'être humain), et alors le train s'arrête, et son trajet ou l'espace parcourru serait le maximum possible si la locomotive en marche utilisait pour elle et sans pertes aucunes les aptitudes qu'elle possédait en état latent pour la totalité de sa marche.

Il découle de cela que dans ces conditions la vitalité sera proportionelle à l'affinité ou à la force assimilatrice F de l'individu, laquelle diminue à son tour avec le temps ou l'âge T ; en vertu de quoi le vitalité V, pourra s'exprimer par cette fermule :

$$V = f\,(FT). \qquad (1.)$$

Les variables F et T représentatives de la force assimilatrice et l'âge où le temps de la vie de l'homme sont entr'elles relationnées par une nouvelle formule :

$$F = +f_1\,(T). \qquad (2.)$$

expression des variations que souffre la force assimilatrice, qui est la maxima M au moment de naître, quand f_1 (T) est zéro, et est nul quand $M = f_1$ (T). Etant la vie fonction de F et de T et F l'étant aussi de T, en résumé la vie peut être pour chaque homme une fonction plus ou moins compliqué du temps :

$$f.\ (FT).$$

La formule 1 contient trois variables et représente une surface ; mais comme la (2) se vérifie entre la F y T, signifie un cilindre de génératrices parallèles anexe V, et dont l'intersection avec le plan FT soit la curve (2). En considérant ensembles les deux formules on représentera la curve d'intersection des deux surfaces dans l'espace.

La fonction $V = f_2$ (T) est de telle composition que dans le cas de $T = o$ (au moment de naître) donne à V une quantité maxima, laquelle irait diminuant à mesure que décroîtrait l'affinité ou force assimilatrice et augmenterait avec le temps la fonction de l'âge f_1 (T) s'annulant l'activité dans le cas de $M = f_1$ (T).

Pour exprimer sensiblement et dans l'espace ces idées, nous considérerons un système d'axes co-ordonnés, dans lesquels l'axe vertical V représentera la vitalité, l'horizontal F sis dans le plus du papier, la force assimilatrice ou d'affinité des cellules, et le normal à ce plan T, les temps. (Voir le dessin No. 1.)

La ligne représentative des variations de F en fonction de T est :

$$F = M - f_1\,(T)$$

on pourrait construire dès qu'on aurait déterminé *à priori* on à *posteriori* (après la mort de l'individu) par des points donnant des valeurs à T depuis O, auquel correspond le maximum F_1 de F, jusqu'à $\triangleq$, époque de la mort par senilité dans laquelle :

$$M = f_1\,(T)\,;\ y\ F = o.$$

Une fois cette courbe tracée, qui est la projection de la ligne réelle, la représentation des forces vitales dans l'espace on l'obtiendrait en élevant, sur chaque point de la courbe F_1 G $\triangleq$ sise dans le plan FT, une perpendiculaire, et mesurant sur elle avec l'échelle adoptée l'intensité de la force vitale accumulée que peut développer l'homme dès ce moment. La même chose peut se faire sur chaque point, au moyen des valeurs des trois cordonnées qui le déterminent comme il arrive avec le point P déterminé par les valeurs V^1, F' et T' de V, F et T. La courbe que nous avons étudiée est celle de la vie en état de santé, mais dès que celle-ci s'altère pour une cause quelconque, la

continuité de la courbe souffre une modification plus on moins profonde, selon l'intensité de cette cause et des conditions où elle s'est développée. (Voir le dessin No. 2.)

Soit α A $\triangleq$ la courbe normale de la vie d'un individu supposé jouissant de parfaite santé, et considérant le cas où celle-ci viendrait à s'altérer pour une cause quelconque : cette dernière agirait à la façon d'une résistance dans la machine motrice de l'organisme humain, de sorte que, considérant l'équivalent F de pertes de force assimilatrice et celui de vitalité V produit, nous pourrons construire, 1° la courbe qui relationne le temps et les forces d'assimilation F, et plus après, celle qui relationne les trois quantités énoncées.

Supposons par exemple, qu'à l'âge de 25 ans advienne une maladie qui a sa loi et sa courbe représentative $E = S_4$ (F, T) nous l'exprimerons dans ses relations avec la force assimilatrice ou d'affinité par une ligne dont l'influence seulement disparaîtra par exemple à 36 ans ; la courbe sur la plan F, T sera une projection de cette courbe E qui relationnera la perte de vitalité, celle de la force assimilatrice, et l'âge de l'individu.

Cette courbe E, obtenue, nous pourrons connaître l'influence qu'elle exerce sur la courbe normale α A $\triangleq$, et nous déduirons une nouvelle courbe A E B dont le résultat sera d'offrir le tracé A B anormal puisque, rétablie sa santé, la fonction vie peut continuer à se développer, mais comme les coëfficients de l'équation se seront altérés, celle-ci sera maintenant :

$$V = f_3 (F, T) - f_4 (F, T)$$

mais avant de l'age $\triangleq$ il arrivera que

$$f_3 (F, T) = f_4 (F, T)$$

et conséquemment, au lieu de prolonger sa vie jusqu'à $\triangleq$ 72 ans, comme s'il eut eu santé, il vivra seulement par exemple $\triangleq' = 53$ ans. Dans les cas de mort subite par suicide ou homicide (voir Fig. 1) la courbe se brise et se substitue en avant par une ligne droite M O normal à l'axe des T.

Une fois la santé altérée ou bien détruit le fonctionalisme organique, l'individu a besoin de développer des résistances naturelles ou d'agents extérieurs (médication) capables de rétablir l'équilibre ; dans le premier cas, un ou plusieurs organes du fonctionnalisme se trouvent altérés, et alors, de même que la médication peut aggraver la maladie si ses effets sont convergents, elle peut guérir si ses effets sont divergents ; dans ce cas, l'équation de la vie en état de santé.

$V = f$ (FT) se transforme en époque de maladie en celle-ci :

$$V = f_3 (FT) - f_4 (FT) = f_5 (FT) = f_5) (FT^1)$$

et alors il devient nécessaire de recouvrir à un agent a naturel on thérapeutique qui, introduit dans l'organisme, développe une action $f_6 (a)$ qui paralyse la de f_4 (FT) : de sorte que

$$f_5 (FT) - f_4 (FT) + f_6 (a) = f_2 (FT).$$

La vie, comme nous avons dit plus haut, n'est pas la fonction simple d'un seul organe.

Dans le cas où la vie se développe normalement, la fonction $V = f(FT)$ sera continuée, et la vie sera d'autant plus longue qu'elle tardera davantage à couper sur l'axe celles de T et cela arrivera dans la même proportion autant que moindre sera la courbure de la ligne et partant plus grand le rayon de courbure de celle-ci.

Cette courbure est représentée par $\frac{w}{ds} = \frac{1}{\rho}$ dans laquelle ds est un élément infiniment petit de la courbe et w l'angle de contingence que forment les tangents tracées à la courbe en ses deux extrêmes, ρ représentant le rayon de la courbure.

La courbure s'exprimera par la formule :

$$\frac{1}{\rho} \sqrt{\left(d\frac{dF}{ds}\right)^2 + \left(d\frac{dT}{ds}\right)^2 + \left(d\frac{dV}{ds}\right)^2}.$$

La longévité d'un individu dépendra de la vitalité qu'il apporte en entrant au monde, augmentant sa longévité si la quantité de vie restant la même que celle d'alors, augmente le rayon de courbure de la ligne représentative de son existence, et enfin que celle-ci ne s'altère point sous l'influence d'agents extérieurs ou des maladies, causes qui abrègent toujours les cours et la durée de la vie.

Annexe, No. 2.

Mortalité absolue par mois pendant la décade de 1880–1889.

Années.	Janvier.	Février.	Mars.	Avril.	Mai.	Juin.	Juillet.	Août.	Septembre.	Octobre.	Novembre.	Décembre.	Total
1880	983	685	685	564	519	582	668	569	565	573	572	614	7,579
1881	650	562	596	530	588	629	672	590	527	594	544	856	7,338
1882	963	898	981	648	562	620	535	530	551	584	593	843	8,308
1883	830	784	968	794	685	643	674	631	572	620	623	854	8,678
1884	923	810	703	644	633	684	828	682	542	590	602	774	8,415
1885	862	604	720	691	682	628	838	1,442	1,182	781	606	763	9,805
1886	801	617	734	609	622	556	622	563	517	632	632	992	7,897
1887	1,096	987	907	724	586	584	655	589	505	695	847	972	9,145
1888	873	810	844	715	637	684	745	669	586	639	635	828	8,660
1889	989	939	836	769	607	574	545	538	493	584	523	1,028	8,425
Total et moyen	897·0	769·6	797·4	668·8	612·1	618·4	678·2	680·9	604·0	629·2	617·7	852·4	84,250

The Economic Advantages of Industrial Hygiene.

BY

B. H. Thwaite, C.E., F.C.S., A.M. Inst. C.E.

When the author wrote his first articles on this subject subsequent to his work dealing with the sanitary arrangements of our factories,* the economic advantages of the practical application of hygiene to industrial hives had not been realised by our large employers of labour. The early and more recent factory Acts in force contain a few provisions tending, in a measure, to the desirable condition of factory and workshop healthfulness; but these conditions were only and sparsely adopted by the compulsory force of the legislative enactments. Employers, considering the stipulations fussy and an unnecessary interference with the industrial liberty, and as involving an expense that should not be enforced, naturally object until compelled to incur this expenditure—which has in their eyes no equivalent return.

It is an evidence of the comparative ignorance of the economic value of hygienic measures, that employers have regarded with such suspicion, and have evaded when they could, the hygienic applications that involved an expenditure. This veil of ignorance is, however, being lifted, and the readiness with which members of both sides of the British Houses of Legislature have accelerated the passing of the new Factory Acts, containing fuller and wider hygienic measures, is a valuable index of the state of the public mind, which has faintly realised that one of the factors of industrial success is the preservation of the health and vigour of the workpeople. It is, however, remarkable that employers have not recognised the enormous importance of the healthful condition of their workshops as a first-class economic factor of production.

In England the peculiar climatic conditions and other fortuous, natural, and generic circumstances have produced men of originally very powerful physique, which, alas, has been sadly reduced in the last half century. Let any one stand at the opening door of one of our large textile and dust-producing factories, and examine the physique of the workmen and women as they emerge for their breakfast meal; it is often a file of wan faces and attenuated and stunted frames, and the general physique is not one that can be considered typical for Englishmen. It would be an interesting hygienic comparison to test the physical strength of ten men working in the free air of heaven with that of ten men from one of these insanitary hives of industry. The comparative figures would speak in eloquent if silent reproach.

If employers could fully realise that an expenditure incurred in carrying out adequate sanitary measures for the benefit of their workpeople would be a wise and profitable one, it is quite likely that an affirmative answer to the questions of, will it pay? would produce the

* "Our Factories and Warehouses, their Sanitary and Fire-resisting Arrangements." B. H. Thwaite, London: E. and F. N. Spon, 1882.

desired result, and it would not need legislative action to induce manufacturers to make their workshops healthful. Employers realise that if their prime motor is improperly housed or inadequately fed with steam, they will not obtain the full efficiency from it. If they could apply the same reasoning in considering their workmen, they will arrive at the conclusion that the workman cannot do as much work, nor do it so efficiently, if he is not well and amply provided with the natural requirements of pure air, ample sunlight, and innocuous and sanitary means for the removal of animal waste. The natural advantages of a bracing climate and of a condensed atmosphere have given British employers an acknowledged initial step in advance of European competitors; but this step has been more than neutralised by indifference to the value of hygienic measures.

On the continent, especially in France and in Alsace, sanitary, structural, and safety precautions have been in several instances adopted with marked success. In one instance, to be fully described, these sanitary improvements resulted in an increased out-put efficiency equal to 6 per cent. This substantial value applied to an annual output of a value of 100,000*l.* means an increase of 6,000*l.*, amply justifying the additional expenditure involved. We have not, so far as the author is aware, any comparable statistics of the kind in this country.

The new Factory Act has increased the application of sanitary measures, and it would be interesting if a table were prepared for the next Congress, showing the advantages to the health of the workpeople of the applications of these new sanitary measures to some large factory. It would also enormously add to the almost immeasurable value of health reports if medical officers could tabulate in their reports the relative healthfulness of different processes of industry, as carried on in different factories.

It is of supreme national importance to every country to see that, like its army of fighters, its army of workers is well supplied with all that nature demands to sustain healthy and vigorous life. The health of the fighting army has been the care of most nations in recent years; and since the days of the late illustrious General Morin, the healthfulness of the habitat of soldiers in time of peace has left little to be desired, and in physique the British soldier of war is far superior to his brother soldier of industry. Why should this be? No nobler purpose could be advanced by this Congress than that of educating the minds of the large employers of labour to the economic advantages that follow the application of industrial hygiene, and of thus preserving the health and vigour of the workpeople.

The mortality data given in the author's work already referred to show the abnormal and excessive mortality of the workpeople (especially from diseases of the respiratory organs) in many of our industrial establishments; and more recent data—although unfortunately sparse—demonstrate that industrial hygiene in this country is seriously, and to our disgrace, neglected. Since this paper was written, the medical officer of health of one of our large northern towns has sufficiently connected specific industrial influences on the health of workpeople, and

he finds that of the deaths due to phthisis—11·4 per cent. were amongst weavers; 6·42 per cent. were amongst spinners; and 2·3 per cent. amongst labourers. With a knowledge of the circumstances attending these industrial operations, he defines the causes of abnormal mortality from chest diseases in the following sequence:—1st, Temperature; 2nd, Vitiated atmosphere; 3rd, Humidity.

We, however, know that neither the first (instance steel smelters and ironworkers) nor yet the third of these (sequential) causes would have a serious effect on the health if the second cause were absent, but they become potent factors of micro-organic development—when all the three causes are present together—so that in many places the vitiation of air due to inadequate methods of ventilation becomes the factor most dangerous to the health of the workpeople.

In the flax-preparing rooms the striking figures of mortality given are repeated, the deaths in the preparing room from phthisis alone averaging 31 per 1000; in the heckling room the average is 11·1 per cent., amongst the flax weavers it is 9 per cent.

The general admissions of the witnesses before the Parliamentary Labour Commission show that generally, and especially in the textile industries, ventilation and other sanitary conditions are defective; one witness even stated that 90 per cent. of the weavers died from chest diseases.

The national loss from such a preventible source of premature mortality cannot be estimated. The nation has reared the producing element to the condition of an expert in proficiency, and by neglect of hygienic precautions, which may be considered comparatively costless, this productive element is suddenly cut off and lost. Hence, on both individual and national grounds, is industrial hygiene economic.

An instance of the practical application of the science of industrial hygiene may be seen in the weaving establishment of the late M. Fournet d'Orival, at Lisieux. The principles of sanitation laid down in the author's work for dust-producing processes have been followed almost to the letter, and it is satisfactory to know that the development of this hygienic scheme also benefited by the examination and advice of the late General Morin, who cordially gave M. Perreau (M. Fournet's engineer) the benefit of his lengthened and observant experience. It may be interesting to enumerate briefly the salient essentials that a scheme of ventilation should possess for application to a dust-producing process. 1st. The air to be introduced at a level above the heads of the workpeople; 2nd. The vitiated and dust-laden air to be withdrawn at the floor level by means of a fan, by an aspiratory tube, or by the use of the factory chimneys; 3rd. As fast as the dust is produced, it should be removed by this downward system of ventilation so that the dust from the looms is prevented from floating to the breathing level; 4th. The channels for leading away the vitiated air and dust to be arranged below the floor, traversing the principal footways, and having branch connections with each dust-producing machine; 5th. The outlet channels to be covered with gratings easily removable for cleaning purposes; 6th. Air inlets to be distributed along external walls or roof; 7th. Inlet air to be heated to the temperature suited to the exigency of

i p. 2596.

the process, and properly distributed throughout the room; 8th. Outlet upcasts to be carried above level of roof, and when convenient to be connected with chimneys. In the Lisieux application these conditions were faithfully observed.

The arrangement for increasing the hygrometric condition of the atmosphere was rather novel. In the centre of each air inlet on the slope of the roof, and near the ridge, a water-jet under heavy pressure is deflected on to a surface in the air-way; the water in its pulverised condition thus moistens the air as it enters the weaving shed, and this to any desired degree. The following are further data of this successful hygienic application.

Dimensions of Weaving Shed.—Length, 61·20 metres; width, 33·10; height, 3·30; capacity, 6,000 cubic metres. Number of bays, 17; structural character of roof, saw-tooth form; total roof surface, 2,025 square metres; number of workmen, 400; net volume of air per man per hour, 15 cubic metres; gross volume of air for workman per hour, 30 cubic metres.

Heating arrangements.—High-pressure steam led through bright copper pipes 0·16 metre in diameter; the pipes placed 1 metre above the looms, and carried on brackets projecting from columns.

Air supply.—The air inlets provided in roof some 0·20 metres below ridge at a distance above the nearest workman of 3·60 metres. There are 128 air introductory orifices equally distributed over 17 bays. The area of the orifices is greater in proportion to the distance from main air supply. The vitiated and dust-laden air escapes through underground culverts built 0·20 metre below the floor. There are ten of these culverts, distributed over the area covered by the 17 bays, and debouching into a larger one which is connected to the factory chimney. Each culvert has eight inlet orifices covered with movable grids; each culvert as well as the main one is provided with regulating valves; the chimney is 54 metres in height, and its aspiratory power is adequate to provide the required displacement of pure air. This is an economic method of utilising the dynamic equivalent value of the residual heat contained in sensible form in the waste gases. The value of this excess of heat from the steam boilers burning 1000 kilos of coal per hour will be understood when it is stated that 45,000 cubic metres per day can be exhausted without interfering with the boiler draught.

The cost of this hygienic installation was, the author believes, some 700*l.*; this at 5 per cent. is equivalent to an annual cost of 35*l.* The increased efficiency of the workpeople, proved by the greater output of 6 per cent., will return this capital in the first twelve months; so that here we have an ideal investment of capital, promoting health, promoting wealth, and destroying human discontent—all proving that the economic advantages of industrial hygiene are worthy of the State and of the individual.

Wednesday, 12th August 1891.

The Chair was occupied by
The President, FRANCIS GALTON, Esq., F.R.S.

Les Migrations en France et en Europe.*

PAR

M. LEVASSEUR.

Sommaire.—Déplacement des campagnes vers les villes.—Comparaison de la population née dans la commune ou dans le département avec la population immigrée.—Changements produits par l'émigration et l'immigration dans la population urbaine et dans la population rurale d'un recensement à un autre.—Les étrangers en France.—Les causes de l'immigration.—La démographie des étrangers.—La mortalité des étrangers.—Les étrangers dans les villes.—Les avantages et les inconvénients.—Les migrations en Angleterre, en Allemagne et dans d'autres États européens.—Les Français hors de France en Europe et les étrangers dans les États européens.—Le bien et le mal.—La question de la population au point de vue légal.

Déplacement des campagnes vers villes.—Les populations ne sont ni stationnaires en nombre, ni fixes dans leur domicile : les chapitres précédents en fournissent maintes preuves. Nous nous proposons d'étudier dans celui-ci les déplacements de population qui se produisent en France de département à département, en Europe d'État à État et même dans l'intérieur de quelques États.

Nous savons déjà qu'en France la population urbaine n'a cessé d'augmenter depuis 1846 (date à partir de laquelle la constatation de ce mouvement a été faite régulièrement) aux dépens de la population rurale (†), que la population a diminue dans certains départements (‡), quoiqu'il n'y eut pas excédent des décès sur les naissances (§), et que les villes s'accroissent d'ordinaire d'autant plus rapidement que leur population est plus considérable, quoique les habitants s'y trouvent dans de moins bonnes conditions démographiques qu'à la campagne (‖). En dix ans, de 1876 à 1886, l'émigration paraît avoir enlevé environ

(*) Chapitre inédit ; extrait du troisième volume de *La Population française*, qui est sous presse.

(†) Voir livre II., ch. iv.

(‡) Voir livre II., ch. vi.

(§) Voir livre II., ch. vii. et xiii. Il y a cependant en France 30 départements dans lesquels on constate, de 1887 à 1889, un excédent des décès sur les naissances. Voir livre IV., ch. v.

(‖) Voir livre II., ch. xiii. et xvii.

1,276,000 habitants à la population rurale et l'immigration (dans laquelle est compris le contingent de l'étranger) paraît avoir fourni 1,700,000 habitants à la population urbaine (*).

Ce mouvement des campagnes vers les villes est le changement le plus considérable qui se soit produit depuis quarante ans dans la répartition de la population française. Toutefois il n'est pas le seul. Il y a des mouvements temporaires que les recensements ne saisissent pas toujours et qui sont cependant caractéristiques. Ainsi, les travaux publics et la construction des chemins de fer attirent, pendant un temps et sur certains points, des groupes nombreux de travailleurs ; la construction des maisons dans les grandes villes à la même conséquence dans la saison propice à ce travail : on sait que la Creuse envoie chaque année à Paris des milliers de maçons. La récolte amène dans un grand nombre de départements une colonie de passage ; c'est ainsi que des bandes de Belges et de Flamands vont louer leurs bras pour la moisson dans le bassin de la Seine et reviennent peu à peu vers leurs foyers ; que des Bretons remontent la Loire jusque dans la plaine du centre et que des Italiens s'avancement par delà le Rhône.

Comparison de la population née dans la commune ou dans le département avec la population immigrée.—La facilité des communications a beaucoup favorisé les migrations temporaires et les déplacements définitifs. Le Tableau I. suivant donne une idée de ces derniers.

La première colonne de ce tableau fait connaître l'accroissement ou la diminution, entre les années 1881 et 1886, du nombre des individus habitant la commune où ils étaient nés. Dans la majorité des départements (55 départements) le nombre des individus dans la commune qu'ils habitant a diminué : on se déplace plus facilement. La différence est très sensible dans la Sarthe, la Seine-Inférieure, la Drôme, les Alpes-Maritimes, le Tarn, le Gers, l'Ain, l'Aude, la Creuse, la Haute-Saône, le Var, la Haute-Savoie et les Bouches-du-Rhône.

Si, au lieu de la commune, on prend le département comme unité de lieu et si l'on cherche le nombre des personnes habitant le département où elles sont nées, les recensements fournissent les moyens d'étendre la comparaison à une période de vingt années. On voit ainsi qu'en 1866, par 100 habitants, on comptait 86·8 français nés dans le département, 11·7 français nés hors du département et 1·5 étrangers,

---

(*) Ces nombres ne correspondent pas précisément à l'accroissement résultant de déplacements de la population ; car un certain nombre de communes rurales ont passé, durant cette période, dans la catégorie des communes urbaines par suite de l'accroissement de leur population.

Ainsi, entre les deux recensements de 1876 et de 1881, la population rurale paraît avoir diminué de - -	352,886 individus.
Mais 74 communes rurales sont devenues avec 156,685 hab. et 15 communes urbaines sont devenues rurales avec 26,505 hab., différence - - -	130,180 „
donc les communes rurales ont perdu - - en cinq ans, soit environ 44,500 par an.	222,706 habitants.

Tableau I.

Répartition comparée de la Population de la France d'après le Lieu d'origine.*

Départements.	(−) Diminution ou (+) augmentation p. 100, entre les recensements de 1881 et 1886, du nombre des personnes nées dans la commune qu'elles habitaient à l'époque du recensement.	Nombre des individus nés dans le département ou hors du département (Exprim. en milliers d'unit.)						Excèdent sur 100 habitants (en 1886) de l'émigration (−) ou de l'immigration (+) 1886-1886.
		En 1866.			En 1886.			
		Français.		Étrangers.	Des Français.		Étrangers.	
		Nés dans le département.	Hors du département.		Nés dans le département.	Hors du département.		
.	2.	3.	4.	5.	6.	7.	8.	9.
1. Ain	− 10	331	33	2·0	317	43	5	− 0·8
2. Aisne	− 5	512	43	6	463	78	13·5	− 1
3. Allier	− 2	338	37	0·5	372	52	1	− 2·3
4. Alpes (Basses-)	− 5	134	7	2·0	114	9	4·2	− 7
5. Alpes (Hautes-)	− 2	115	6	1·6	106	13	5	+ 1·6
6. Alpes-Maritimes	− 15	177	9	10·8	169	22	44	+ 1·6
7. Ardèche	− 1	368	18	0·9	346	25	0·7	− 9·5
8. Ardennes	+ 0·7	283	17	23·6	259	36	37	− 1·8
9. Ariège	− 1	242	8	0·1	216	14	0·4	− 9·2
10. Aube	− 2	237	23	1·7	206	46	5	+ 3·3
11. Aude	− 9	271	16	0·5	270	48	10·2	+11·6
12. Aveyron	+ 1·7	386	13	0·3	389	24	0·5	− 8·4
13. Bouch.-du-Rhône	− 6	395	104	41·0	375	150	77·5	+10·5
14. Calvados	+ 5	417	55	1·7	373	69	1·9	+ 0·6
15. Cantal	+ 10·4	230	8	—	218	19	0·5	− 7·1
16. Charente	− 3	346	27	2·0	316	47	0·9	− 1·8
17. Charente-Infér.	+ 3·8	436	37	0·6	428	32	1·1	− 3·9
18. Cher	− 0·8	308	26	0·5	313	43	0·6	− 7
19. Corrèze	− 2	307	3	0·0	305	14	0·4	− 7·2
20. Corse	+ 4·9	246	4	7·9	245	5	16·5	− 8·2
21. Côte-d'Or	− 1·5	344	36	0·7	316	62	4·5	− 3
22. Côtes-du-Nord	− 3	632	9	0·4	592	22	0·5	−13·4
23. Creuse	− 9	264	9	0·7	244	17	0·2	−15·8
24. Dordogne	− 6	478	23	0·7	444	3	1·2	− 9·8
25. Doubs	+ 1·7	259	27	6·5	254	41	15·5	+ 0·9
26. Drôme	− 15	290	32	0·5	267	44	2·6	− 1·5
27. Eure	− 6·5	339	52	1·2	286	70	3·6	− 0·1
28. Eure-et-Loir	—	257	32	0·8	236	48	2·0	+ 1·6
29. Finistère	+ 4	620	24	0·9	666	34	0·5	− 5·3

* M. le docteur Lagneau (L'Émigration de France, comptes-rendus de l'Académie des Sciences morales et politiques, 1884) a dressé un tableau du même genre pour la période 1876-1881.

Tableau 1.—*suite.*

Répartition comparée de la Population de la France d'après le Lieu d'origine.

Départements.	(−) Diminution ou (+) augmentation p. 100, entre les recensements de 1881 et 1886, du nombre des personnes nées dans la commune qu'elles habitaient à l'époque du recensement.	Nombre des individus nés dans le département ou hors du département (Exprim. en milliers d'unit.)						Résident sur 100 habitants (en 1886) de l'émigration (−) ou de l'immigration (+) 1881-1886.
		En 1886.			En 1886.			
		Français.		Étrangers.	Des Français.		Étrangers.	
		Nés dans le département.	Hors du département.		Nés dans le département.	Hors du département.		
1.	2.	3.	4.	5.	6.	7.	8.	9.
30. Gard	+ 36	379	47	2·7	391	22	1·9	− 1·9
31. Haute-Garronne	+ 1·4	440	46	2·0	395	72	4·8	− 4·8
32. Gers	− 11·1	277	18	0·5	235	32	6·1	− 1·2
33. Gironde	+ 8	576	108	13·0	555	203	11	+ 9·6
34. Hérault	+ 32	366	55	2·5	420	15	11	+ 6·8
35. Ille-et-Nilaine	− 1·6	554	33	0·4	558	59	1·6	− 1·7
36. Indre	+ 1·7	259	17	0·6	264	30	0·5	− 7
37. Indre-et-Loire	− 1·3	289	33	0·8	270	69	1·3	+ 5·1
38. Isère	+ 1	547	29	0·9	534	42	4	− 1·4
39. Jura	− 5	274	22	0·7	243	32	4·5	− 7·2
40. Landes	—	295	12	0·3	287	14	0·6	−15·2
41. Loir-et-Cher	− 0·9	245	29	0·5	240	38	0·6	− 3·3
42. Loire	− 3·6	460	74	1·8	486	112	2·8	− 1·4
43. Loire (Haute-)	+ 1·7	301	11	0·3	296	20	0·3	− 8·9
44. Loire (Inférieure	+ 1·4	533	62	2·1	578	62	1·4	− 2·4
45. Loiret	− 1·2	318	37	0·5	314	61	1·6	− 0 4
46. Lot	− 2·4	281	7	0·6	268	2	0·3	− 5·3
47. Lot-et-Garonne	− 1·2	303	21	3·3	258	41	6·8	+ 2·6
48. Lozère	− 1·9	134	3	0·2	131	8	0·1	−14·1
49. Maine-et-Loire	+ 0·4	482	47	0·7	447	78	0·9	+ 0·8
50. Manche	− 5·4	543	20	2·2	480	38	0·8	− 5·1
51. Marne	− 5·6	321	54	7·4	315	98	16·7	+ 7·3
52. Marne (Haute-)	− 2	224	34	0·6	202	39	4	− 4·1
53. Mayenne	− 5·2	338	29	0·2	302	38	0·3	− 7·1
54. Meurt.-et-Moselle	− 1·4	775	63	27·0	301	95	35·2	—
55. Meuse	− 5·7	273	22	3·4	235	46	9·5	− 1·8
56. Morbihan	+ 2·9	473	16	0·4	493	39	0·3	− 5·7
57. Nièvre	− 2·1	314	28	0·4	305	41	0·7	− 6·3
58. Nord	− 1·1	1·111	84	185	1·235	125	305	− 0·9
59. Oise	− 3·6	345	47	8·9	307	81	17·6	+ 3·6
60. Orne	− 2·4	374	41	0·1	322	46	0·5	− 3·1

Tableau I.—*suite.*

Répartition comparée de la Population de la France d'après le Lieu d'origine.

Départements.	(−) Diminution ou (+) augmentation p. 100, entre les recensements de 1881 et 1886, du nombre des personnes nées dans la commune qu'elles habitaient à l'époque du recensement.	Nombre des individus nés dans le département ou hors du département (Exprim. en milliers d'unit.) — En 1866. — Français. — Nés dans le département.	En 1866. — Français. — Hors du département.	En 1866. — Étrangers.	En 1886. — Des Français. — Nés dans le département.	En 1886. — Des Français. — Hors du département.	En 1886. — Étrangers.	Excédent sur 100 habitants (en 1886) de l'émigration (−) ou de l'immigration (+) 1866-1886.
1.	2.	3.	4.	5.	6.	7.	8.	9.
61. Pas-de-Calais	+ 1·5	698	34	10·6	732	88	25	− 2·3
62. Puy-de-Dôme	− 3·1	552	17	0·9	525	31	1·2	− 3·1
63. Pyrénées (Basses-)	+ 8·9	408	13	11	381	29	19·9	− 8·3
64. Pyrénées (Hautes-)	+ 2·4	227	11	0·9	211	18	2·8	− 4·8
65. Pyrénées-Orient	+ 20·3	174	8	4·0	192	7	10·9	+ 2·2
66. Belfort { Rhin Haut / Rhin Bas }	− 2·2	1·024	45	37·0	49	23	8·1	—
67. Rhône	+ 3·3	450	202	11·7	498	245	18	+14·4
68. Saône (Haute-)	− 7·4	298	17	1·3	258	29	3·2	−10·2
69. Saône-et-Loire	− 5·9	553	44	1·6	563	58	2·1	− 8·9
70. Sarthe	− 35·5	425	37	0·5	381	56	0·8	+ 0·5
71. Savoie	− 0·9	257	10	2·7	239	19	9·3	− 5·4
72. Savoie (Haute-)	− 6·6	261	7	4·7	251	14	8·5	− 7·5
73. Seine	+ 10·1	735	1·259	118·4	1·075	1·578	214·3	+26·9
74. Seine-Inférieure	− 21·9	698	85	7·4	689	126	10·2	+ 1·4
75. Seine-et Marne	+ 0·8	296	51	4	265	86	13·1	+ 4
76. Seine-et-Oise	+ 7·5	384	128	9·3	380	234	22·3	+ 2·4
77. Sèvres (Deux-)	+ 0·4	319	12	0·7	308	44	0·3	− 2·1
78. Somme	− 3·7	532	34	4·2	485	57	4·6	− 3·1
79. Tarn	− 12·1	344	11	0·6	329	26	0·4	− 4·6
80. Tarn-et-Garonne	+ 1·3	213	15	0·4	188	24	0·8	− 1·2
81. Var	− 6·7	244	29	15·9	208	49	24·6	− 3·1
82. Vaucluse	− 3·3	238	24	1·2	209	30	1·9	− 6·5
83. Vendée	− 3·6	386	18	0·4	408	27	0·2	− 3·7
84. Vienne	+ 1·3	300	22	0·3	303	40	0·6	− 2·4
85. Vienne (Haute-)	+ 3·9	298	26	0·3	323	34	0·6	− 4·4
86. Vosges	− 1·9	394	22	2·4	353	48	9·2	− 6
87. Yonne	− 1·8	338	31	2·2	306	44	2·5	− 2
Totaux*		33·007	4·404	635·5	30·881	5·923	1·126·7	
						37·930·7		

* En 1886, l'armée a été comptée à part (304,738 hommes présents sous les drapeaux).

TABLEAU II.*

Départements.	Excédent pendant la période 1866-1886 des		Population telle qu'elle aurait dû être en 1886 s'il n'y avait eu ni émigration, ni immigration. (Calculée en ajoutant au recensement de 1866 l'excédent des naissances ou en retranchant l'excédent des décès).	Différence avec la population telle qu'elle était d'après le recensement de 1886.
	Décès sur les naissances.	Naissances sur les décès.		
1. Ain	3,667	—	367,976	— 3,195
2. Aisne	—	3,996	561,021	— 5,991
3. Allier	—	57,106	433,270	— 8,689
4. Alpes (Basses-)	4,926	—	138,074	— 10,027
5. Alpes (Hautes-)	1,713	—	120,404	+ 2,048
6. Alpes-Maritimes	—	3,939	202,757	+ 31,983
7. Ardèche	—	20,660	407,834	— 36,905
8. Ardennes	—	11,645	338,509	— 6,150
9. Ariège	—	3,414	253,850	— 23,260
10. Aube	13,927	—	248,024	+ 8,989
11. Aude	—	6,411	295,037	+ 33,606
12. Aveyron	—	46,927	446,999	— 33,642
13. Bouch-du-Rhône	2,314	—	545,589	+ 57,729
14. Calvados	38,941	—	435,968	+ 3,170
15. Cantal	—	15,604	253,598	— 16,969
16. Charente	7,346	—	370,872	— 6,859
17. Charente-Infér.	—	397	479,926	— 18,766
18. Cher	—	43,209	379,822	— 23,869
19. Corrèze	—	31,733	342,576	— 22,441
20. Corse	—	28,772	288,633	— 21,484
21. Côte-d'Or	11,171	—	371,591	— 11,525
22. Côtes-du-Nord	—	59,521	700,731	— 85,894
23. Creuse	—	30,797	304,854	— 44,329
24. Dordogne	—	34,637	537,310	— 49,677
25. Doubs	—	8,675	306,747	+ 2,780
26. Drôme	5,432	—	318,799	— 4,493
27. Eure	34,832	—	359,635	— 602
28. Eure-et-Loir	9,951	—	280,802	+ 4,793
29. Finistère	—	72,843	735,328	— 35,370
30. Gard	—	6,371	423,376	— 8,471
31. Haute-Garonne	609	—	494,386	— 23,107
32. Gers	18,778	—	276,914	— 3,802
33. Gironde	1,048	—	700,807	+ 67,664
34. Hérault	10,115	—	417,130	+ 29,074
35. Ille et-Vilaine	—	36,646	629,255	— 10,212
36. Indre	—	36,440	314,300	— 19,605
37. Indre-et-Loire	1,088	—	324,105	+ 16,884
38. Isère	—	5,785	587,171	— 8,331
39. Jura	—	2,951	301,428	— 21,556
40. Landes	—	41,235	347,928	— 46,846
41. Loir-et-Cher	—	12,674	288,431	— 9,213

(*) Pour chaque département, nous avons pris le nombre des individus, français ou étrangers, nés dans le département en 1866, nous y avons ajouté l'excédent des naissances sur les décès du département de 1866 à 1886 et retranché l'excédent des décès. Nous avons calculé le rapport pour 100 du nombre ainsi trouvé au nombre des individus, français ou étrangers, nés dans departement en 1886. C'est ce rapport qui est inséré dans la colonne 9 du tableau. Nous donnons les élements de ce calcul qui ont par eux-mêmes un intérêt démographique ; on y voit que, de 1866 à 1886, 34 départements ont eu un excédent des décès sur les naissances et 53 un excédent des naissances sur les décès.

TABLEAU II.—*suite.*

Départements.	Excédent pendant la période 1866–1886 des		Population telle qu'elle aurait dû être en 1886 s'il n'y avait eu ni émigration, ni immigration. (Calculée en ajoutant au recensement de 1866 l'excédent des naissances ou en retranchant l'excédent des décès).	Différence avec la population telle qu'elle était d'après le recensement de 1886.
	Décès sur les naissances.	Naissances sur les décès.		
42. Loire	—	71,503	608,611	– 7,590
43. Loire (Haute-)	—	31,733	344,394	–27,861
44. Loire-Inférieure	—	57,222	655,820	–14,806
45. Loiret	—	20,292	377,402	– 1,497
46. Lot	4,670	—	284,249	–15,485
47. Lot-et-Garonne	31,148	—	296,814	+ 8,720
48. Lozère	—	20,830	158,093	–19,427
49. Maine-et-Loire	11,674	—	520,651	+ 4,429
50. Manche	25,694	—	548,205	–29,556
51. Marne	—	7,954	398,763	+31,616
52. Marne (Haute-)	3,277	—	255,819	–10,645
53. Mayenne	1,916	—	365,939	–26,414
54. Meurt.-et-Moselle	—	—	—	—
55. Meuse	5,535	—	296,118	– 5,505
56. Morbihan	—	59,208	560,292	–28,707
57. Nièvre	—	24,974	367,747	–21,839
58. Nord	—	286,322	1,678,363	–13,184
59. Oise	9,672	—	391,602	+14,653
60. Orne	35,003	—	379,615	–13,247
61. Pas-de-Calais	—	113,972	863,749	–18,399
62. Puy-de-Dôme	—	3,106	574,796	–17,768
63. Pyrénées (Basses)	—	29,599	465,085	–36,029
64. Pyrénées (Hautes)	—	3,728	243,980	–11,660
65. Pyrénées-Orient	—	15,240	204,730	+ 4,192
66. Belfort { Rhin Haut / Rhin Bas	—	12,485	—	—
67. Rhône	7,286	—	671,362	+97,876
68. Haute-Saône	—	5,408	323,114	–32,488
69. Saône-et-Loire	—	76,317	676,323	–53,419
70. Sarthe	28,292	—	435,327	+ 2,698
71. Savoie	—	10,174	281,837	–14,765
72. Savoie (Haute-)	—	20,111	293,879	–20,628
73. Seine	—	136,913	2,287,829	+580,497
74. Seine-Inférieure	—	21,030	813,798	+ 11,192
75. Seine et Marne	4,791	—	349,609	+ 14,441
76. Seine-et-Oise	26,000	—	507,727	+128,570
77. Sèvres (Deux-)	—	25,047	358,202	– 7,060
78. Somme	8,872	—	563,768	–17,794
79. Tarn	—	16,481	371,994	–16,506
80. Tarn-et-Garonne	13,568	—	215,401	– 2,954
81. Var	17,179	—	291,371	– 9,689
82. Vaucluse	8,087	—	258,004	–17,516
83. Vendée	—	45,819	450,292	–15,076
84. Vienne	—	26,446	350,978	– 7,956
85. Vienne (Haute-)	—	45,223	371,260	–14,441
86. Vosges	—	15,920	434,924	–25,165
87. Yonne	11,193	—	361,396	– 7,747
France entière (excédent des naissances sur les décès)		1,419,950		

et que même, depuis six ans, sous l'influence d'une baisse du prix du bétail engraissé, ils ont sensiblement diminué. Cependant l'immigration montre que ce n'est pas tant le moyen d'employer des bras que la volonté de supporter les charges de la famille qui fait défaut à cette population habitué dans ses herbages à un certatn bien-être et à une certaine mollesse (*).

Changements produits par l'émigration et l'immigration dans la population urbaine et dans la population rurales d'un recensement à l'autre.—Quoique la population rurale soit en général la plus stable, c'est pourtant dans son sein que se forment les principaux courants d'émigration. Nous connaissons déjà cette tendance pour l'ensemble de la population† ; nous pouvons la constater par départements à l'aide du Tableau III. suivant ; le tableau ne peut être lu comme les autres tableaux du manière il se trouvera dans le decourrant cependant qui présente l'excédent de l'émigration sur l'immigration ou inversement dans l'intervalle de deux recensements, de 1872 à 1876, de 1876 à 1881 et

* Dans un travail inséré dans le *Journal de la Société de statistique* et reproduit dans les *Grands faits économiques et sociaux*, M. Loua a établi pour deux époques (1856 et 1876) autres que celles que nous donnons, la comparaison entre la Normandie et la Bretagne ou la natalité est forte.

	Population urbaine.	Population rurale.	Ensemble.
	BRETAGNE.		
Population en 1856	509,574	2,329,377	2,838,951
Excédent des naissances	—	318,433	296,348
Excédent des décès	22,085	—	—
Population naturelle (1876)	487,489	2,647,810	3,135,299
Population réelle (1876)	595,488	2,423,832	3,019,320
Immigration	107,999	—	—
Émigration	—	223,978	115,979
	NORMANDIE.		
Population en 1856	660,848	2,016,993	2,677,841
Excédent des naissances	—	—	—
Excédent des décès	51,649	39,982	91,631
Population naturelle (1876)	609,199	1,977,011	2,586,210
Population réelle (1876)	736,701	1,817,998	2,554,699
Immigration	127,502	—	—
Émigration	—	159,013	31,511

† Nous rappelons (voir livre I., ch. xi.) que ce mouvement d émigration se produisait avant 1789. En voici une preuve nouvelle fournie par un mémoire (*Mémoire* No. 10), remis en 1891, à l'Académie des sciences morales et politiques pour un concours sur la population. En 1673, un relevé des décès de l'Hôtel-Dieu de Paris porte que sur 501 malades, il y en avait 117 de Paris, 44 de l'Ile-de-France, 45 de la Normandie, 40 de l'Orléanais, 38 de la Champagne, 28 de la Bourgogne, 27 de la Picardie, etc.

de 1881 à 1886 (les nombres sont exprimés en milliers d'uni
les centaines d'unités comme expression fractionnaire) et la pr
par 1,000 habitants de cet excédent de 1881 à 1886.* Dans
départements il y a eu diminution de la population rurale, soit
trois intervalles, soit au moins dans un ou deux.

Tableau III.

Immigration et Émigration.

Excédent { + de l'immigration sur l'émigration. / − de l'émigration sur l'immigration.

(Nombres exprimés par milliers d'unités).

Départements.	Population Urbaine				Population Ru		
	de 1872 à 1876.	de 1876 à 1881.	de 1881 à 1886.	Prop. p' 1000 h. 1881-86*	de 1872 à 1876.	de 1876 à 1881.	de 1 à 18
Ain	+ 13·1	+ 1·2	+ 5·3	+11·9	−10·4	− 4·8	−
Aisne	+ 14·2	+ 9·8	+ 4·5	+ 3·0	−13·3	−17·3	−
Allier	+ 3·0	+ 12·7	− 0·9	− 0·9	− 5·4	−18·1	−
Alpes (Basses)	+ 0·3	− 0·8	− 2·4	−11·3	− 2·7	− 2·6	+
Alpes (Hautes)	+ 0·1	+ 1·3	+ 1·2	+ 8·7	− 1·2	+ 0·4	−
Alpes-Maritimes	+ 5·1	+ 21·5	+ 11·1	+ 8·5	− 2·1	+ 0·06	−
Ardèche	− 1·8	+ 2·5	+ 2·3	+ 3·9	− 1·3	−14·3	−
Ardennes	+ 12·1	+ 9·2	+ 1·5	+ 1·6	−13·7	− 7·6	−
Ariège	− 0·2	+ 2·8	− 3·2	− 8·0	− 5·9	−10·5	−
Aube	+ 2·2	+ 7·1	+ 6·3	+ 8·5	− 4·3	− 3·0	−
Aude	+ 8·8	+ 30·1	+ 0·3	+ 0·2	+ 2·6	− 5·6	−
Aveyron	+ 1·1	+ 3·8	+ 2·9	+ 3·6	− 3·3	−18·5	−1
Belfort (Territoire de)	+ 4·8	+ 3·6	+ 4·8	+16·7	+ 0·2	—	—
Bouches-du-Rhône	+ 4·6	+ 40·0	+ 24·7	+ 5·0	− 5·8	− 3·6	−
Calvados	+ 6·5	+ 1·4	+ 8·9	+ 7·9	− 4·2	− 6·3	−
Cantal	+ 0·7	+ 2·6	+ 1·2	+ 4·7	− 6·1	− 2·4	+
Charente	− 1·8	+ 7·5	+ 3·9	+ 5·6	+ 3·0	−13·7	−
Charente-Inférieure	− 8·3	+ 15·3	+ 5·5	+ 4·7	+ 6·1	−20·6	+1
Cher	− 1·3	+ 5·3	+ 2·3	+ 2·5	− 3·6	−14·1	−
Corrèze	+ 2·0	+ 10·0	− 0·8	− 1·5	− 1·9	−17·0	−

(*) La proportion des émigrants ou immigrants par 1,000 hab. de la catégorie, est
la population en 1881.

* L'excédent en nombres absolus qui figure dans les colonnes 2, 3, et
est la différence entre le chiffre de la population tel qu'il est au dernier re
et le chiffre de la population tel qu'il était au recensement précédent, au
l'excédent des naissances sur les décès dans l'intervalle des deux rece
Cette différence se trouve pour les années 1872 et 1876 dans le recensemen
p. 74 et 75 ; nous l'avons calculée pour 1876–1881 et pour 1881–1886. La
(colonnes 5 et 9) par 1,000 habitants est établi d'après la population calcul
lation recensée en 1881, excédent des naissances sur les décès) et la
recensée en 1886.

TABLEAU III.—*suite.*

Départements.	Population Urbaine				Population Rurale			
	de 1872 à 1876.	de 1876 à 1881.	de 1881 à 1886.	Prop. p^r 1000 h. 1881-86.	de 1872 à 1876.	de 1876 à 1881.	de 1881 à 1886.	Prop. p^r 1000 h. 1881-86.
Corse	+ 1·1	+ 4·9	+ 7·3	+12·7	− 2·3	− 1·4	− 7·7	− 3·6
Côte-d'Or	+ 5·5	+ 9·4	+ 5·4	+ 5·2	− 3·1	− 3·1	− 5·4	− 1·9
Côtes-du-Nord	− 5·0	+ 15·9	+ 0·4	+ 0·7	− 9·0	−42·0	−13·1	− 2·3
Creuse	+ 1·1	+ 0·2	+ 0·2	+ 0·8	− 4·5	− 8·3	− 0·5	− 0·2
Dordogne	+ 5·1	+ 7·0	+ 2·4	+ 3·7	− 9·6	−15·1	−19·8	− 4·6
Doubs	+ 5·9	+ 4·4	+ 10·1	+11·5	+ 0·4	− 5·0	−14·0	− 6·3
Drôme	+ 2·1	+ 4·3	− 7·8	− 8·8	− 3·0	−10·0	−11·0	+ 4·9
Eure	− 3·7	+ 4·3	+ 3·5	+ 5·0	+ 4·3	− 5·3	− 2·8	− 0·9
Eure-et-Loir	+ 5·3	+ 1·9	+ 9·7	+20·2	− 4·1	− 4·0	− 4·7	− 2·0
Finistère	+ 3·7	+ 12·6	+ 15·4	+ 9·8	−10·0	−22·2	− 5·7	− 1·0
Gard	+ 4·1	− 4·6	+ 5·6	+ 2·8	− 3·3	− 6·4	− 4·6	− 2·1
Garonne (Haute-)	+ 5·6	+ 10·5	+ 13·9	+ 7·7	−11·1	−10·7	− 9·5	− 3·3
Gers	− 6·4	+ 5·4	− 1·6	− 3·4	+ 6·5	− 2·6	− 1·7	− 0·7
Gironde	+ 26·5	+ 19·8	+ 35·7	+10·8	− 0·2	− 7·2	− 8·2	− 1·9
Hérault	+ 10·4	+ 4·0	− 1·7	− 0·7	− 1·3	− 6·1	+ 4·2	+ 2·2
Ille-et-Vilaine	+ 8·3	+ 16·0	+ 7·5	+ 5·2	− 8·8	−19·4	−11·7	− 2·5
Indre	+ 0·5	+ 8·5	+ 2·1	+ 2·6	− 5·1	−12·6	− 2·9	− 1·4
Indre-et-Loire	+ 3·2	+ 5·1	+ 13·6	+17·5	+ 2·2	− 1·4	− 3·6	− 1·4
Isère	+ 7·6	+ 11·7	+ 4·3	+ 3·3	− 6·9	−14·9	− 7·9	− 1·7
Jura	+ 2·4	+ 3·3	+ 1·2	+ 2·0	− 4·6	− 9·5	− 6·4	− 2·8
Landes	+ 1·0	+ 7·1	+ 1·9	+ 5·3	−10·1	−22·7	−10·9	− 4
Loir-et-Cher	+ 1·4	+ 1·9	+ 0·8	+ 1·4	− 3·5	− 3·7	− 2·0	− 0·9
Loire	+ 29·4	+ 12·3	+ 0·2	+ 0·9	− 9·2	−21·3	−13·5	− 4·4
Loire (Haute-)	+ 4·0	− 0·4	+ 1·0	+ 1·9	− 9·9	− 5·8	− 3·6	− 1·4
Loire-Inférieure	+ 12·1	+ 10·4	+ 4·0	+ 2·0	−20·1	−14·1	+ 1·0	+ 0·2
Loiret	+ 10·8	+ 7·5	+ 4·0	+ 3·8	−12·3	− 8·3	− 4·0	− 1·5
Lot	− 0·1	+ 3·3	+ 0·5	+ 1·6	− 5·6	− 0·8	− 7·3	− 3·0
Lot-et-Garonne	+ 3·7	+ 4·8	+ 3·8	+ 5·3	− 0·8	− 2·5	− 2·5	− 1·0
Lozère	+ 1·4	+ 1·0	+ 0·5	+ 3·0	− 3·1	− 1·9	− 7·8	− 6·1
Maine-et-Loire	+ 4·8	+ 18·2	+ 7·4	+ 5·6	− 7·8	−10·2	− 3·8	− 0·9
Manche	+ 0·6	+ 1·3	+ 12·1	+11·6	−10·1	−13·3	−12·6	− 3·0
Marne	+ 14·3	+ 21·2	+ 0·3	+ 0·1	− 1·0	−11·0	+ 5·7	+ 2·3
Marne (Haute-)	+ 1·8	+ 5·3	+ 1·5	− 2·9	− 2·9	− 3·9	− 7·9	− 4·0
Mayenne	+ 3·2	+ 8·8	+ 3·1	+ 4·6	− 5·9	−18·5	− 8·3	− 3·0
Meurthe-et-Moselle	+ 20·1	+ 20·3	+ 13·9	+ 9·2	+ 1·7	− 8·4	− 4·4	− 1·6
Meuse	+ 2·6	+ 2·7	+ 3·5	+ 6·0	− 2·2	− 7·4	− 0·5	− 0·2
Morbihan	+ 1·4	+ 5·9	+ 6·9	+ 7·4	− 5·2	−15·0	−11·7	− 2·7
Nièvre	+ 0·7	− 2·9	+ 5·6	+ 8·1	− 4·8	− 5·1	− 9·6	− 3·4

TABLEAU III.—*suite.*

Départements.	Population Urbaine				Population Rurale			
	de 1872 à 1876.	de 1876 à 1881.	de 1881 à 1886.	Prop. p^r 1000 h. 1881-86.	de 1872 à 1876.	de 1876 à 1881.	de 1881 à 1886.	Prop. p^r 1000 h. 1881-86.
Nord	+ 15·0	+ 56·4	− 4·1	− 0·4	−18·3	−47·1	+ 2·5	+ 0·4
Oise	+ 10·2	+ 6·7	+ 4·7	+ 5·1	− 6·2	− 2·7	− 3·9	− 1·2
Orne	+ 2·0	+ 3·8	+ 2·5	+ 3·3	− 1·3	−13·4	− 4·4	− 1·4
Pas-de-Calais	+ 25·7	+ 2·4	+ 32·2	+11·6	−23·2	− 8·1	−27·0	− 5·0
Puy-de-Dôme	− 1·6	+ 0·03	+ 10·4	+ 9·1	+ 0·2	− 6·5	− 5·7	− 1·2
Pyrénées (Basses-)	+ 3·8	+ 7·5	+ 4·9	− 4·9	− 8·4	−14·7	−14·2	− 4·2
Pyrénées (Hautes-)	+ 4·8	+ 1·9	+ 2·0	+ 4·4	− 4·6	− 5·5	− 4·6	− 2·4
Pyrénées Orientals	+ 6·5	+ 8·7	− 2·7	− 3·1	− 3·3	− 3·0	+ 1·6	+ 1·4
Rhône	+ 22·2	+ 54·6	+ 19·7	+ 4·0	+ 7·7	−16·3	+15·3	+ 6·1
Saône (Haute-)	+ 4·5	+ 1·9	− 1·3	− 2·7	− 8·4	−13·1	− 5·3	− 2·1
Saône-et-Loire	− 5·3	+ 18·3	+ 1·3	+ 0·9	+ 1·9	−28·4	−16·7	− 3·4
Sarthe	+ 7·8	+ 9·5	+ 9·0	+ 8·9	− 8·2	−11·9	− 8·3	− 2·4
Savoie	+ 1·0	+ 2·4	+ 2·9	+ 9·0	− 4·9	− 7·9	− 4·5	− 1·9
Savoie (Haute-)	− 0·1	+ 1·9	+ 2·3	+10·7	− 4·7	− 8·1	− 4·7	− 1·8
Seine	+163·4	+367·6	+146·6	+ 3·5	− 1·4	+ 2·4	−10·5	−28·4
Seine-Inférieure	+ 16·0	+ 38·3	+ 23·6	+ 5·6	−19·8	−81·4	−14·0	− 3·5
Seine-et-Marne	+ 4·3	+ 5·6	+ 4·6	+ 5·8	− 0·4	− 4·0	+ 1·6	+ 0·6
Seine-et-Oise	+ 30·7	+ 20·0	+ 39·9	+18·9	− 4·4	+ 1·2	+ 5·5	+ 1·5
Sèvres (Deux)	− 2·2	+ 6·1	+ 3·5	+ 7·7	+ 0·2	− 1·5	− 7·1	− 2·3
Somme	+ 10·7	+ 3·0	+ 8·7	+ 5·5	−14·4	−10·0	−10·3	− 2·6
Tarn	+ 10·3	− 2·2	+ 2·5	+ 2·4	−11·6	− 2·5	− 6·1	− 2·4
Tarn-et-Garonne	+ 3·0	+ 3·6	+ 3·7	+ 6·0	− 2·1	− 4·4	− 2·8	− 1·8
Var	+ 3·1	− 3·6	− 0·2	− 0·1	− 0·3	+ 0·07	+ 2·6	+ 2·1
Vaucluse	− 8·6	− 3·0	+ 3·4	+ 3·1	+ 1·3	− 4·1	− 1·9	− 1·4
Vendée	+ 4·9	− 6·1	+ 0·5	+ 1·0	− 7·8	+ 0·3	− 2·2	− 0·6
Vienne	+ 6·5	+ 3·0	− 0·5	− 0·7	− 4·5	−29·0	− 5·8	− 2·1
Vienne (Haute-)	+ 6·2	+ 4·3	+ 3·8	+ 3·3	− 8·7	− 6·9	− 3·4	− 1·4
Vosges	− 3·7	− 1·2	+ 16·6	+22·0	+ 6·6	− 3·9	−13·4	− 4·1
Yonne	+ 2·0	+ 3·6	+ 5·2	+ 8·1	− 4·6	− 4·0	− 5·2	− 1·7

Sur 261 excédents qui figurent dans les trois colonnes de la population rurale, 228 sont en faveur de l'émigration*. Dans les colonnes, au contraire, de la population urbaine, sur les 261, on n'en compte, en faveur de l'émigration, que 36, qui s'appliquent pour la plupart à des départements comme les Basses-Alpes, l'Ariège, le Gers, le Var même et les Vosges, où domine le caractère rural.

* Sur les 33 excédents en faveur de l'immigration figurent des départements comme le Rhône et Seine-et-Oise, où une partie des petites communes est habitée par une population presque urbaine.

L'émigration des campagnes vers les villes n'est pas une question nouvelle.

Nous avons vu qu'au xviiie siècle on s'en plaignait déjà. En 1848, à la suite de l'émeute du 15 mai, et, sur la demande du Comité du travail, une enquête fut prescrite qui, entre autres questions, portait celle-ci : "Quels seraient les moyens d'arrêter l'émigration vers les " villes des travailleurs des campagnes et d'appliquer aux travaux des " champs les bras inoccupés de l'industrie ?" La question est restée sans réponse, et le mal, si c'en est un, sans remède. La plupart de ceux qui ont été proposés depuis cette époque sont en opposition avec la liberté individuelle et partant contraires à l'intérêt économique du pays ou inefficaces. Une société de géographie a mis récemment au concours la question de savoir si ce ne serait pas " l'œuvre d'une sage " administration de nos forces vives de songer à repeupler les contrées " presque incultes et improductives de notre territoire et à les coloniser " plutôt que de favoriser le départ d'émigrants pour des pays outre-mer." Elle ne réfléchissait pas que les terres presque incultes ont, comme les autres, des propriétaires, et que, si ceux-ci n'en tirent pas un meilleur parti, c'est probablement parce qu'elles sont peu productives ou qu'ils manquent de capitaux, que l'Etat ferait une mauvaise affaire en les achetant et les colons qu'on y installerait une non moins mauvaise en cherchant à les exploiter sans capital.

Les étrangers en France.—D'autre part, les étrangers viennent en plus grand nombre se fixer en France. Nous avons constaté qu'au recensement de 1851, le premier qui fasse mention de ce fait, leur nombre était de 380,831, représentant 1·06 p. 100 habitants de la France, et qu'en 1886 il s'élevait à 1,126,531 (population présente), représentant 2,97 p. 100.*

Il a triplé en moins d'un demi-siècle.† Encore faudrait-il ajouter à ce nombre les 103,886 personnes d'origine étrangère qui étaient naturalisées français à l'époque du recensement.‡ Les Belges, les Italiens§, les Allemands,‖ les Espagnols et les Suisse fournissent les plus forts contingents (43, 24, 9, 7 et 7 p. 100) ; les groupes les plus compacts de chaque nationalité se trouvent en général dans le voisinage de sa frontière ou à Paris, comme les groupes de Français à l'étranger.¶ Le tableau précédent confirme et complète cette notion.

---

* Voir livre II., ch. iv., p. 343.

† A Paris, il a plus que triplé : 53,016 en 185', 180,253 en 1886.

‡ La naturalisation a fait de rapides progrès. En 1872, lorsque le recensement constatait 740,668 étrangers, il n'enregistrait que 15,303 naturalisés.

§ Le nombre des Italiens a augmenté depuis 1851, dans le rapport de 100 à 418 ; celui des Belges, de 376 ; celui des Suisses, de 307.

‖ La statistique comprend parmi les Allemands les Alsaciens-Lorrains qui sont en grand nombre à Belfort, dans la Meurthe-et-Moselle et dans les Vosges.

¶ C'est pourquoi les départements dans les quels le recensement de 1886 a constaté la plus torte proportion d'étrangers, ont été les suivants : Alpes-Maritimes (19·1 p. 100 de la population totale), Nord (18·3), Bouches-du-Rhône (12·8), Ardennes (11·3), Belfort (10·5), Var (8·7), Meurthe-et-Moselle (7·6). Après ces départements se place la Seine (7·2). Les étrangers qui, comme les Anglais, les Américains et les Russes, viennent pour leur plaisir, habitent surtout Paris.

Les voies de communications ne sont que le moyen que facilite le déplacement. La cause qui détermine cette affluence est ailleurs: c'est la difficulté de vivre dans son pays natal ou l'espérance de mieux vivre ailleurs, qui pousse l'homme à changer de résidence. L'immigrant passe d'une contrée à une autre suivant le niveau des salaires.

La grande majorité des immigrants en France sont des ouvriers ou des employés; ils viennent, beaucoup plus d'Allemagne, de Belgique, d'Italie, où le travail est peu payé, que d'Angleterre où il est largement rémunéré. Les personnes que l'étude attire vers un grand centre littéraire, artistique ou scientifique, celles qui, cherchant les plaisirs, ne reculent pas devant la dépense pour se les procurer et celles qui désirent passer modestement une douce existence dans le loisir de la province, trouvent en France, mieux que dans maint autre pays, l'occasion de satisfaire leurs goûts. Quoique bien moins nombreuses que les individus des deux premières catégories, elles grossissent la colonie étrangère.

Sur le million que le dénombrement de 1886 a enregistré, combien y avait-il d'hôtes de passage qui dépensaient leur argent en France.* Combien de voyageurs de commerce, dont les opérations profitaient à nos importations et à nos exportations? Combien de négociants qui contribuaient aussi à notre richesse nationale? Ils formaient une notable minorité dont on ne sait pas le nombre.† Ce ne sont certainement pas ceux-là qu'on peut accuser de créer un péril ou de causer un dommage. Nous parlerons dans le chapitre suivant des salariés et de la concurrence qu'ils font aux Français.

La démographie des étrangers.—Une grande partie de ces étrangers est définitivement fixée: le tiers de ceux que le recensement de 1886 a enregistrés étaient nés en France. En 1888 et 1889, pour la première fois, la Statistique générale a fait connaître la part des étrangers dans le mouvement de la population en France. Leur situation démographique ne paraît pas inférieure à celle de la population française; car leur natalité a été de 25·8 p. 1,000 en 1888 et de 23·5 en 1889, tandis que celle de la France entière était de 2·39; cependant—ce qui est plus regrettable que surprenant—les naissances illégitimes figurent à raison de 15·4 p. 100 dans le total des naissances étrangères‡; leur mortalité est de 16 p. 1,000 contre 21·9 pour la France entière.§ L'excédent de

* Au recensement de 1886, le nombre des étrangers recensés comme présents a été de 1,126,531; celui des étrangers recensés comme domiciliés, de 1,115,214; mais les relevés ne sont pas assez précis pour qu'on conclue de la différence de ces deux nombres qu'il y avait 12,000 étrangers de passage en France.

† Sur 180,253 étrangers recensés à Paris en 1886, il y en avait 16,735 qui vivouent de leur revenu ou qui étaient domestiques.

‡ En 1888, la proportion était de 8·5 p. 100 pour la France entière. La proportion des naissances illégitimes chez les étrangers, qui n'était en 1888 que de 7 parmi les Espagnols, de 11 parmi les Italiens, s'élèvait à 17 parmi les Suisses et à 24 parmi les Allemands (22 en 1889); à Paris particulièrement, à 33 parmi les Allemands et à 38 parmi les Anglais.

§ La mortalité pour toutes les nationalités étrangères était inférieure à la moyenne française, excepté pour les Allemands qui comptaient 23 décès par 1,000 habitants en 1888 et 20·8 en 1889.

leurs naissances sur leurs décès (11,134 en 1888, 7,360 en 1889), figurait pour un quart dans l'excédent total de la France (44,772,) en 1888 et pour 8½ pour 1,000 en 1889: proportion considérable assurément qui a fait dire à quelques publicistes que la population française ne se recruterait bientôt plus que par les étrangers.

Ces rapports peuvent faire quelque illusion au premier abord, comme ceux de la population parisienne. Ils paraissent favorables, parce que l'immigration amène surtout des adultes, qui sont dans la période de la fécondité et de la plus faible mortalité et que l'émigration emporte une partie des vieillards qui vont jouir de leurs épargnes dans leur pays natal et qui y meurent. Mais, en réalité, les mariages sont un peu moins fréquents parmi les étrangers que parmi les Français*, parce que leur situation même les oblige souvent à rester célibataires. Les mariages étrangers paraissent plus féconds que les mariages français (3·7 enfants par mariage); mais, comme ils appartiennent en majorité aux classes inférieures, le taux diffère peut-être peu de celui des classes correspondantes de la population française.

Une partie des recrues étrangères se fond, plus ou moins complètement, dans la population française par le mariage; car, sur 11,308 mariages, il y en a eu 3,065 entre étrangers et 8,243, c'est-à-dire sept dixièmes environ, entre français et étrangères ou ètrangers et françaises†.

La moralité des étrangers.—On aurait donc tort de lance l'anathème, au nom de la moralité, contre la colonie étrangère en masse.‡

Mais on a raison de signaler les éléments impurs qui pénètrent sur le territoire français par l'immigration. Les malfaiteurs cherchent en général les pay étrangers: ils y sont plus inconnus et, comme les grandes villes les séduisent par le double attrait de la richesse à voler et de la foule pour se dissimuler, Paris est une des villes d'Europe qui en attirent le plus. La statistique judiciaire a constaté que, dans la période 1881–1885, il y a eu environ 20 condamnations au criminel ou au correctionnel par 1,000 étrangers domiciliés en France§, tandis qu'il n'y en a que 5 par 1,000 français.

---

* Dans la population française, en 1888, il y a eu 7·2 mariages, soit 14·4 époux par 1,000 habitants; parmi les étrangers (1,128,000 environ en 1888), il y eu 3,065 mariages entre étrangers, 3,403 mariages d'étrangères avec des français, 4,840 de Françaises avec des étrangers, total 11,308 mariages, soit 10 mariages et 20 époux par 1,000 étrangers; mais dans le nombre de ces époux figurent les Français et Françaises qui ont contracté des mariages mixtes. Il n'y a eu en réalité que 13,813 étrangers ou étrangères soit 12·2 par 1,000 étrangers. L'année 1889, sur 10,980 mariages d'étrangers fournit à peu près les mêmes proportions.

† 3,403 entre français et étrangères et 4,840 entre françaises et étrangers.

‡ Un député, M. Pradou, dans un projet de loi proposé en 1882, s'exprimait ainsi: "Notre territoire semble être devenu le refuge des gens louches de tout pays. "Paris reçoit le rebut social des deux continents. Toute une société trouble "d'aventuriers exotiques s'y donne rendez-vous. L'escroquerie et le vol sont leurs "moyens ordinaires d'existence."

§ Ce sont les Italiens qui causent le plus de condamnations.

Les misérables sont aussi dans la colonie étrangère en proportion beaucoup plus forte que dans la population indigène et l'hôpital est parfois pour eux l'antichambre de la prison.*

Les étrangers dans les villes.—La population des départements qui renferment des grandes villes est particulièrement instable, c'est que les grandes villes elles-mêmes sont les foyers d'attraction les plus puissants. Nous le savons déjà.† Paris est probablement la ville de France‡ où le nombre des habitants nés dans la commune est relativement le moindre ; il n'était que de 779,418 en 1886. Paris, à cause de son importance même et de la centralisation politique et économique de la France, est aussi au premier rang sous ce rapport parmi les capitales du continent qui participent à un haut degré de cette mobilité. Le tableau suivant nous permet de dire que près de la moitié§ et souvent plus de la moitié des habitants des grandes villes sont des immigrants.

Villes.	Date du recensement.	Nombre de personnes nées		Population totale.	Par 100 habitants.
		dans la ville.	hors de la ville.		Nombre de personnes nées dans la ville.
Paris - - -	1881	721,421	1,518,507	2,239,928	32·2
Rome - -	1881	134,156	166,311	300,467	44·6
Milan - - -	1881	155,714	166,125	321,839	48·4
Berlin - -	1880	505,329	651,065	1,156,394	43·7
Vienne‖ - -	1880	271,429	433,327	704,756	38·5
Londres (dist. métr)	1881	2,401,955	1,414,528	3,816,483	62·9

Les avantages et les inconvénients.—Que faut-il penser de cette affluence qui a introduit dans la population française près de 3 p. 100 d'élément étranger et qui augmente sans cesse par l'immigration et par les naissances ? Les opinions diffèrent selon le point de vue d'où l'on considère le phénomène.

* En 1883, 3,167 chefs de famille étrangers étaient secourus à Paris par les bureaux de bienfaisance. En 1888, les asiles de nuit ont reçu 9,994 étrangers, dont 4,756 allemands et 2,689 belges.

† Voir livre II, ch. XVII.

‡ Avec Nice peut-être.

§ A Londres, en 1881, la proportion des individus nés dans la ville était plus forte que dans les autres villes ; c'est que Londres n'est pas au même degré que Paris une ville où le plaisir, l'étude et l'administration attirent les immigrants. 585,000 personnes nées à Londres, se trouvaient en 1881 dans d'autres parties de l'Angleterre. Mais à Edinburgh, Glasgow, Perth, la proportion s'élevait à 50 p. 100 environ.

‖ Sans la population militaire.

Sous celui de la production de la richesse, le spectacle est satisfaisant. Un pays peut éprouver une pléthore de population et une gêne résultant d'un trop grand nombre d'enfants à élever. Tel n'est pas le cas de la France, car les immigrants étrangers sont, à peu d'exception près, des rentiers capables de payer leur consommation ou des travailleurs mettant leur activité à la disposition du capital national qui les sollicite et qu'ils sont fructifier : ce qui est un bien.

Ces derniers ne font pas descendre par leur concurrence les salaires au-dessous du taux des autres pays, puisque la supériorité de ce taux est la raisson même de leur affluence ; mais ils l'empêchent, dans certains cas, de monter à un niveau hors de proportion avec celui de ces pays ; ainsi la consommation nationale ne paie pas les services trop cher et, d'autre part, le commerce peut offrir les produits nationaux à des prix acceptables au dehors.

Il importe de marquer la mesure et la limite des divers intérêts ne présence dans cette question. L'élévation progressive des salaires est assurément très désirable puisqu'elle contribue au bien-être dans la classe la plus nombreuse de la population ; mais elle doit résulter d'un accroissement de la puissance productive des travailleurs ou de la somme des richesses produites, afin qu'un certain équilibre soit maintenu. Si cet équilibre se trouvait détruit par une élévation exagérée, les entreprises qui ne donneraient plus de profits seraient abandonnées ou la consommation de marchandises trop coûteuses se restreindrait, et tel groupe de travailleurs pour avoir voulu trop exiger, verrait tarir la source même de son revenu. Nous parlons d'un groupe particulier ; car il est impossible que tous les salaires d'une nation s'élèvent et se maintiennent à un niveau supérieur à celui de la production de la richesse. En cette matière, comme en beaucoup d'autres, la politique la plus sage et la plus prévoyante est celle qui prend la liberté des contrats pour règle.

Au point de vue de la moralité, il est légitime de préoccuper de cette affluence. Beaucoup d'étrangers en effet sont célibataires et, que le travail ou le plaisir ait été le mobile de leur venue, ils ne contribuent assurément pas à rendre la population plus chaste. Beaucoup aussi sont partis avec une pensée de retour qui les empêche de se fixer et de s'intéresser au pays dont ils se considèrent comme des hôtes temporaires. Beaucoup enfin se sont expatriés parce qu'ils avaient l'esprit, inquiet, mobile, parce qu'ils étaient peu capables de gagner leur vie ou parce qu'ils n'étaient pas capables de se faire estimer dans leur patrie ; le trop plein du vase national qui déborde ainsi par l'émigration contient beaucoup de lie. C'est un danger qui exige assurément des mesures spéciales de police, mais qu'il ne faut pas s'exagérer, puisque nous venons de constater que, sous le rapport de la nuptialité et de la natalité, les étrangers ne paraissaient pas se comporter plus mal que le reste de la population.

Au point de vue des ouvriers envisageant, ainsi que font la plupart des travailleurs, le problème par le côté qui touche à leurs intérêts personnels et immédiats, c'est une concurrence d'autant plus pénible

eux-mêmes et qu'il est tout-à-fait inutile de laisser les salaires se niveler dès qu'on empêche le nivellement du prix des marchandises, même celui des denrées alimentaires.*

La France n'est pas le seul pays où cette question puisse soulever des haines. Tous les Etats qui ont une forte immigration, une nombreuse population ouvrière et la suffrage universel y sont exposés. Les États-Unis, comme nous le verrons dans le chapitre suivant, n'y ont pas échappé.

Les gouvernements qui n'ont pas à compter avec la foule ne sont pas pour cela exempts de ce genre de préoccupation ; l'antagonisme politique qui est aujourd'hui la plaie de l'Europe a poussé celui d'Allemagne à des mesures vexatoires contre les étrangers en Posnanie et en Alsace-Lorraine et celui de Russie à interdire aux Allemands l'accès de la propriété foncière dans les provinces baltiques. Depuis une vingtaine d'années, les Russes se plaignent d'une infiltration germanique lente, mais continue dans leurs provinces du sud-ouest, des Allemands achetant des terres aux paysans, ne les revendant qu'à des compatriotes quand ils sont forcés de les aliéner et dépossédant peu à peu la race slave.

A un point de vue plus général, des écrivains appréhendent que la race française ne perde son originalité par une infusion trop prolongée et trop abondante de sang étranger.† Si leur crainte était fondée le mal serait assurément très grand. Ils se rassureraient peut-être quelque peu s'ils considéraient que les additions se font successivement et que le génie français a assez de puissance pour s'assimiler l'élément étranger, qu'il peut y avoir même profit pour les œuvres économiques comme pour les œuvres de l'esprit à jeter quelques gouttes de personnalité étrangère dans le courant de nos idées et que les États-Unis sont la preuve qu'une nation qui possède un caractère accusé, peut absorber beaucoup, sans se laisser absorber elle-même.

Les migrations en Angleterre, en Allemagne et dans les autres États européens.—Dans tous les pays, il se produit des courants de population des migrations soit définitives, soit temporaires, que déterminent des causes économiques.

La Grande-Bretagne et l'Irlande peuvent être prises à cet égard comme termes de comparaison avec la France.

L'Angleterre est assurément un des pays où la population est le plus mobile, parce que les causes d'instabilité, facilité des communications, activité industrielle, commerciale et maritime, importance des villes, indépendance d'esprit des ouvriers, y sont très énergiques.

---

* Dans une lettre du 4 septembre 1887 publiée dans plusieurs journaux, M. Limousin disait : "Le protectionnisme contre les ouvriers étrangers est la conséquence naturelle du protectionisme contre les marchandises étrangères."

† M. Rochard, dans une communication à l'Académie de médecine (février 1883) en parle comme d'une menace pour l'avenir. "Un peuple qui se recrute à l'étranger perd vite dans ce commerce son caractère, ces mœurs, ses forces propres ; il y perd avec le temps ce qu'il a de plus précieux, sa nationalité."

Le dénombrement de 1881 a recensé, sur 100 habitants du Royaume-Uni, 74·6 personnes nées dans le comté qu'elles habitaient et 25·4 nées ailleurs.*

Dans tous les comtés occidentaux de l'Irlande, plus des neuf dixièmes des habitants se trouvaient dans le comté même de leur naissance : on immigre peu dans le contrées pauvres. Au contraire, les comtés de l'Ecosse méridionale et, en Angleterre, le Northumberland et le Durham, autrement dit le "Border," les comtés du centre situés au sud de l'Humber et ceux du sud-est ont plus d'un quart de leur population originaire d'un autre comté. C'est qu'en Écosse les Highlanders descendent pour chercher du travail dans les basses terres, comme les montagnards en France ; qu'en Angleterre le même mouvement d'émigration se produit dans le pays de Galles (excepté dans les deux comtés miniers du sud), dans le Border écossais, dans la région purement agricole de l'est et du Cornouailles et comtés voisins. Cette émigration se porte sur les régions industrielles du Durham, du Yorkshire, du Lanceshire, du Staffordshire, de Nottingham et des comtés du sud-est.† Aussi y a-t-il en Angleterre comme en France, des parties du territoire où la population diminue ; 9 comtés avaient moins d'habitants en 1881 qu'en 1871 ; dans Anglesea, Brecknock, Rutland et Huntingdon, la diminution a commencé en 1851 ; dans Montgomery, dès 1841.

De comté à comté pour l'Angleterre, comme d'État à État pour la France, les migrations se font d'ordinaire au plus proche, c'est-à-dire que les immigrants attirés par le travail viennent la plupart des comtés voisins ou du moins de ceux avec lesquels les communications sont le plus faciles.‡ Cependant les grandes villes exercent leur attraction au loin. Une particularité de la démographie qui tient non-seulement à la domesticité, mais à la manufacture, c'est qu'il se trouve plus de femmes que d'hommes résidant hors de leur comté natal.§

Relativement à l'étranger, l'Angleterre ayant une natalité moyenne et une densité forte, est, malgré le taux élevé de ses salaires, un pays d'émigration plutôt que d'immigration. En 1881, on y a compté seulement 145,860 personnes nées dans les colonies et possessions britanniques et 203,890 personnes nées dans des pays étrangers.‖

---

* La proportion s'élève à 30·2 pour l'Ecosse et n'est que de 22·4 pour l'Irlande, pays agricole. Voir "The Law of Migration," by E. G. Ravenstein, *Journal of the Statistical Society*, juin 1885.

† Le recensement fait connaître le comté dans lequel sont nés les habitants des trois royaumes. Il y a des comtés d'immigration où le nombre des habitants dépassait en 1881 de plus de 25 p. 100 celui des individus nés dans le comté, quelle que fut leur résidence (Surrey, 30, p. 100 ; Glamorgan, 26 ; Selkirk, 37 ; Lanark, 29 ; Edinburgh, 29 ; Dumbarton, 26 ; Dublin, 32), et d'autres au contraire où le nombre total des habitants était, par suite de l'émigration, inférieur de plus de 25 p. 100 au nombre des personnes nées dans le comté (Radnor, 37, p. 100 ; Hunts 33 ; Rutland, 33 ; Wilts, 27 ; Salop, 26 ; Kinross, 26 ; Wicklow, 25).

‡ Le même phénomène se produit certainement dans les migrations intérieures de la France ; mais nous ne possédons pas de données statistiques pour le constater.

§ 112 femmes pour 100 hommes en 1881.

‖ Cependant cette dernière catégorie de personnes a augmenté de 24·7 p. 100 de 1871 à 1881.

L'ouvrier anglais se défend contre la main-d'œuvre étrangère par son habileté professionnelle et par la surveillance jalouse des trades unions. Cependant il se trouve, à Londres surtout, beaucoup d'ouvriers russes et allemands, surtou parmi les tailleurs, et les ouvriers anglais s'en plaignent.

En Allemagne les recensements constatent des mouvements analogues. En 1885, 11 provinces de Prusse avaient perdu une partie de la population née sur leur territoire.* Deux provinces seulement, Rheinland et Westphalie et la ville de Berlin en avaient davantage. Les habitants se sont concentrés dans la capitale et dans la région industrielle.† Dans le reste de l'Allemagne, le royaune de Saxe, Bade, le Brunswick, l'Anhalt, l'Alsace-Lorraine et les trois villes de Brême, Lubeck et Hambourg ont gagné des habitants; Brême a même 28 p. 100 de ses habitants qui sont nés hors de son territoire, et Hambourg 36 p. 100. Les autres États sont en perte et cette perte s'élève jusqu'à 18 p. 100 pour le Mecklenbourg-Strelitz et à 24 p. 100 pour la principauté de Waldeck.

Les Français hors de France en Europe et les étrangers dans les États européens.—La frontière est un obstacle, mais n'est pas une limite infranchissable à l'émigration. Nous traiterons dans le chapitre suivant des émigrants qui quittent l'Europe; dans celui-ci nous bornons nos recherches à cette partie du monde.

Sous le régime du passeport obligatoire, 40,900 passeports ont été délivrés en France, année moyenne, pendant la période 1854–1860, pour 53,800 personnes. Sur ce dernier nombre, 15,920 avaient déclaré vouloir se fixer à l'étranger, dont 6,560 en Europe, à savoir : 1,950 en Espagne et en Portugal, 1,120 en Italie, 970 en Angleterre, 802 en Allemagne, 730 en Suisse, 485 en Russie, 480 en Belgique et aux Pays-Bas; presque tous les autres quittaient l'Europe. Le Dr. Bertillon‡ a fait remarquer que ce nombre était nécessairement inférieur à la réalisté, parce que certains émigrants, particulièrement ceux qui habitaient près de la frontière, négligeaient de se munir d'un passeport et que certains autres, notamment les jeunes gens qui partaient avant la conscription,§ ne pouvaient pas en demander.

En 1861, les consuls, invités à faire connaître, à propos du recensement le nombre des Français résidant à l'étranger, ont fourni des nombres dont le total s'élevait, pour l'Europe, à 127,436. Ils étaient établis en Suisse (45,000), en Belgique (35,000), dans les Iles britanniques, Jersey compris (16,049), en Espagne (10,642), en Allemagne (6,429, renseignement incomplet), en Italie (4,718), en Russie (2,479).

Une autre enquête du même genre faite par les consuls à l'occasion du recensement de 1886, a accusé 408,000 Français établis à l'étranger,

---

* Prusse orientale, 8 p. 100; Poméranie, 7·8 p. 100; Posen, 7 p. 100; province de Saxe, 7 p. 400; Hohenzollern, 5·9 p. 104; Silésie, 5·5 p. 100; Brandebourg, 5 p. 100; Prusse occidentale, 4 p. 100.

† Berlin, 47·7 p. 100; Rheinland, 2·4 p. 100; Westphalie, 2·06 p. 100.

‡ *Dictionnaire encyclopédique des Sciences Médicales*, art. Migrations.

§ Cette fraction n'est pas négligeable, puisque dans le département des Basses-Pyrénées, un millier de conscrits, c'est à-dire environ le quart de la classe, ont manqué à l'appel en 1871 et en 1872.

dont 200,000 en Europe. La seconde est peut-être moins incomplète que la première et, d'autre port il n'est pas étonnant que, depuis un quart de siècle, le nombre des Français vivant à l'étranger ait augmenté.

De même que les populations voisines de la France pénètrent en plus grand nombre que les autres sur son territoire, de même c'est dans les pays limitrophes que la France a le plus de représentants : en Suisse (54,260), en Belgique (52,000), en Allemagne (36,700)*, en Espagne (17,600), en Italie 10,900).

Après la Suisse et a Belgique que l'exiguité de leur territoire jointe à leur position sur la carte rendent plus pénétrables que les autres à l'immigration, la France est le pays d'Europe qui compte la plus forte proportion d'étrangers (22·9 pour 1,000 d'individus nés à l'étranger et 29·4 d'individus de nationalité étrangère).

PROPORTION DU NOMBRE DES ÉTRANGERS À LA POPULATION TOTALE DANS LES ÉTATS D'EUROPE.

(D'après les recensements de 1875 à 1881.)

ÉTATS.	RECENSEMENTS DE 1875 À 1881 (Extrait de l'Introdution du recensement de la Population de de l'Italie en 1881). Sur 1,000 Individus recencés. Nombre d'Individus.	
	Nés à l'Etranger.	De Nationalité Étrangère.
Angleterre	6·7†	—
Ecosse	1·7†	—
Irlande	3·8†	—
Pays-Bas	16·9	—
Belgique	26	—
France	22·9	29·4
Allemagne	—	9
Prusse	7·8‡	3·6‡
Saxe	3·6‡	12·4
Bavière	11·7‡	10·6
Wurttemburg	5·5‡	5·7
Bade	9·2‡	8·5
Suisse	—	74·1
Autriche	—	7·5§
Hongrie	1·7§	1·0§
Espagne	2·4	—
Italie	3·5	2·1
Grèce	—	19·2
Danemark	32·2	—
Norvège	20·6	—

* Recensement allemand de 1885.

† Cette proportion est celle des individus nés hors du Royaume-Un ; car le nombre des individus nés hors d'Angleterre et Galles et habitant l'Angleterre, était de 36 p. 1,000 ; il s'élevait en Écosse à 88,5 pour les individus nés hors d'Écosse et à 17·7 en Irlande pour les individus nés hors d'Irlande.

‡ Individus nés hors de l'Empire allemand ; car pour la Prusse le nombre des individus nés hors de Prusse était de 19·3 p. 1,000.

§ Individus nés hors de l'Autriche-Hongrie.

On voit par ce tableau que la statistique ne fournit pas dans tous les pays les mêmes moyens de calculer la population étrangère. Néanmoins, nous avons dressé un état approximatif de la répartition des étrangers dans les principaux États d'Europe, qui montre que les Italiens et les Belges et vraisemblablement les Espagnols, ne sont nulle part en aussi grand nombre qu'en France, que les Allemands émigrent beaucoup en France, en Suisse, en Autriche, et qu'ils se portent volontiers aussi dans les Pays-Bas et la Belgique, sur le Bas-Danube et en Danemark, que les Austro-Hongrois pénètrent surtout en Allemagne et dans la péninsule Pelasgique, qu'entre les trois peuples scandinaves les émigrations sont fréquentes. Partout la proximité facilite l'immigration. Partout les salaires la provoquent ; c'est pourquoi les Anglais, malgré leur réputation de cosmoplitisme, ont peu de représentants dans les pays d'Europe, la France excepté.

Les recensements ne donnent pas une notion complète des migrations européennes ; car, saisissant une population à un moment déterminé, ils ne tiennent pas compte des mutations qui ont pu se produire à d'autres moments. Il y a des pays où les stations balnéaires attirent pendant la saison favorable une foule d'étrangers. Il y a des pays qui fournissent aux autres pays un contingent considérable de bras pour des travaux temporaires. L'Italie, où ce genre d'émigration est très pratiquée et dont la statistique en tient registre, peut être citée comme exemple*. Chaque année, près de cent mille Italiens, agriculteurs, terrassiers, maçons, etc., †partent, la plupart de la Vénétie, du Piémont, de la Lombardie, de la Toscane‡, surtout au printemps, et reviennent quelques mois après, rapportant souvent une partie de leur gain à leur famille. Sur dix émigrants de cette espèce on ne compte guère qu'une femme.

DISCUSSION.

Dr. Grimshaw (Registrar-General for Ireland) stated that the question of migratory labour from Ireland was first investgated in the year 1841 in connection with the Census of that period. Information collected by the late Dr. Neilson Hannah showed that about twenty years ago the amount of profit obtained by the Irish Agricultural labourer by his trip to England, averaged about 15*l.* per head. In his (Dr. Grimshaw's) opinion the practice of the migration of the labourer from the West of Ireland to England with the view of earning the balance of his living, tended to maintain the congested state of the rural population in the West of Ireland, thus leading to want and even famine in seasons during which the demand for labour in in England and Scotland fell below the usual amount. During the

* De 1876 à 1889, le nombre des émigrants temporaires a varié entre 77,733 (en 1878) et 105,319 (en 1889) ; la moyenne a été d'environ 85,000.

† En 1889, les agriculteurs figuraient dans le total pour 50 p. 100, les terrassiers pour 26, les maçons et charpentiers pour 12.

‡ En 1885, par exemple, 44 p. 100 des départs ont eu lieu en mars et en avril.

distress in the West of Ireland in 1879 this cause operated in conjunction with the failure of the crops at home.

Dr. Rhodes drew attention to the exodus taking place from the agricultural districts of England especially those in the eastern plain. Not only is the population migrating, but it is the young and strong that are migrating, leaving behind the old and feeble; so much so is this the case that the number of old people per thousand in the agricultural counties is almost double the number what it is in the manufacturing districts. This is a very serious matter from an economic point of view, because the curve of pauperism to a very great extent follows the age curve. One of the great causes is the bad, and also insufficient number of, cottages; the very low wages they receive are insufficient to provide them with proper food, and, therefore, they are not able to do the amount of labour that they would if better fed.

Professor Knapp (Strassburg), theilt mit, dass die preussische Regierung fortwährent die Verhaltnisse der *wandernden Landarbeiter* untersuchen lässt—nicht durch grosse amtliche Aufnahmen, sondern durch Studien, welche von jungen Gelehrten und Beamten gemacht werden. Ein Beispiel davon ist das Werk von Karl Kaerger, Die Sachsen Gangerei, Berlin 1890. Für Preusen ist est also nicht zutreffend, dass die Regierung über diese Vorgänge nichts weise.

Professor Mayo Smith (Columbia College, U.S.A.), said that the question of migration of labour was a very important one in the United States at the present time. That country was indebted to immigration for its wonderful developement and prosperity. With the advantages of immigration came also disadvantages. Among the immigrants there were many who were undesirable additions to the population, and the effect was visible in the burden of public and private charity and the records of crime. It was a delicate and difficult problem how to escape them without interfering with the liberty of the individual.

An example of temporary migration in the United States was the influx of French Canadians into the New England States. They came into the factory town, worked for small wages, were very frugal and industrious, accumulated a sum of money and then returned. The economic gain of cheap labour was obtained, but social arrangements, were dislocated. The foreigners did not send their children to the public school, attend church, or take the place of the old native population in the town meeting. It was a serious question whether the economic gain compensated the social loss.

Mr. R. Hamilton said that some time ago in connexion with the Education Act he had gone through the greater part of Norfolk parish by parish. What struck him most was the great diversity of condition in the respect to which Dr. Rhodes has referred. In some parts the provision was very bad; in others closely the adjoining,cottages were of an exceptionally good class. No doubt there were great shortcomings which called for remedy, but he could not but regard the general condemnation as far too severe and too indiscrimate.

Tropical Highlands: their Suitability for European Settlement.

BY

ROBERT W. FELKIN, M.D., Lecturer on Diseases of the Tropics in the Edinburgh School of Medicine.

Although altitude is not everything, it certainly affects climate considerably; indeed, apart from minor factors, the climate of any given locality is mainly influenced by its distance from the equator and its height above sea level.

In considering the effect of altitude on the suitability of tropical climates for the permanent residence of European races, it will be necessary to refer to other factors which exert no little influence upon the possibility of European colonisation in the tropics, but as I have been asked to deal with altitude in a special manner, it will be convenient to make a few very brief remarks upon the effect of altitude in the temperate zone, so as to be able to better consider the part it plays in tropical regions, as modifying an otherwise impossible climate.

It is true that altitude may not always be advantageous and that the term is often loosely employed, sometimes referring to the elevation of a mountain range and at others indicating merely a height of 100 or 200 feet. Subsequently, when referring to altitude in the tropics, I shall specify exactly what I mean.

Altitude influences temperature, the temperature diminishing with height. Theoretically, in a column of dry air the temperature would fall 1° F. for every 180 feet, but the atmosphere contains moisture, and, as Herschel pointed out long ago, we may say that in general the temperature is really decreased by 1° F. for every 300 feet of altitude. This is known as a result of observation, and Buchan gives it more exactly as 1° F. for every 270 feet of altitude.

There is a great difference between the temperature of the day and that of the night in every period of the year, whatever may be the mean annual temperature. Generally speaking, the range of temperature increases from the equator towards the poles, and from the coast towards the interior of a continent, and it is greater in mountainous regions in northern latitudes than in elevated parts of the tropics. In high altitudes the lower temperature is far more marked during the daytime than during the night, and in summer than in winter. There is also in elevated regions a large amount of sunshine and a warm sun temperature. There is a diminution in the quantity of watery vapour, and an increasing force of evaporation.

Height diminishes atmospheric pressure. At 2,500 feet it is one eighth, at 7,500 feet a fourth, less than at sea level, and consequently

the air becomes more and more rarified. The barometer falls about ·001 inch for every foot of ascent. The amount of fall diminishes with altitude. At sea level the exact amount is ·000886 for every foot of ascent.

It must not be lost sight of that the configuration of the ground, even at a considerable altitude above sea level, must be taken into account, for it is certain that a great difference will be met with between the climate of a high plateau, having an elevation of, say, 2,000 or 3,000 feet, and that of an enclosed valley at a considerably higher altitude. Indeed, other things being equal, we find that, even in the tropics, an open plateau at an altitude of 2,500 feet, will be more salubrious than a mountain valley at, say, 5,000 feet.

The influence of altitude upon rainfall varies according to the position of the place and the configuration of the ground. In mountainous regions, rain may be frequent and heavy, either due to a hot and moist atmosphere coming in contact with a cooler atmosphere on the slopes, or to a moist wind being intercepted by a mountain range.

The amount of rain in general increases with the height above the sea, up to a moderate altitude. In higher altitudes the air is too cold to contain much vapour, therefore the yield of rain is less as we ascend higher. In central Europe Dr. Hann found the level of maximum rainfall in winter to be at a height of from 3,000 to 4,000 feet.

Altitude influences man in two ways; generally and physiologically. Doubtless it exerts a great influence upon the character of the population. This is well marked in the difference between the national characteristics of the inhabitants of high altitudes and low plains. In the higher altitudes the people are strong, robust, buoyant, capable of both mental and bodily exertion. They are spare, firm, and muscular, owing to their active and industrious modes of life; quick, irritable, and generous dispositions predominate among them, and the mean duration of life is longer than among the inhabitants of lower regions.

At an altitude of about 3,000 feet above sea level the physiological effects of diminished atmospheric pressure commence to be experienced. The pulse beats more rapidly, by some 15 to 20 beats per minute, respiration is increased, but there is lessened "vital capacity." Rattray found that at a height of 2,000 feet, as tested by the spirometer, it was lessened from 266 to 249 or 243 cubic inches. This increase in the frequency of the pulse and accelerated respiration is due to the deficiency of oxygen. There is likewise increased evaporation from the skin and lungs and a diminution of urine. Digestion and sleep are good.

In considering the effect of altitude upon disease, we have to think of four classes of disease: (*a*) diseases which occur everywhere; (*b*) diseases which depend almost entirely on temperature for their production; (*c*) those which may be termed mountain diseases; and (*d*) those which are absent in mountain regions.

(*a.*) The diseases met with everywhere are those in which heat has no great etiological influence, *e.g.*, the zymotic diseases and

those which may be termed constitutional, such as scrofula, tuberculosis (excepting pulmonary), scurvy, &c. These diseases may occur at any elevation.

(*b.*) Diseases caused by heat, such as hepatitis, dysentery, and, for the most part, malaria.

(*c.*) Diseases common to mountainous climates, such as asthma, due to the rarification of the atmosphere, ophthalmia, due to snow and the intensity of light, inflammation of the lungs and pleura, rheumatism, disorders of the circulatory organs and hæmorrhages, but the last only occur at altitudes above 1,700 feet. When we examine into the cause of death in the higher Swiss valleys, as far as is known, for instance, we find that the people either die of old age, over 70 or 80 years, or else from accidents or of diseases of the lungs or kidneys due to chill. We find also that cancer, stone, and cystitis are comparatively frequent, as also is rheumatism and apoplexy. The children sometimes suffer from an epidemic of scarlet fever, measles, or diphtheria, but typhus, dysentery, and acute bronchial catarrhs are of very infrequent occurrence, and nervous diseases are very rare. Goitre and cretinism occur.*

(*d.*) Certain diseases are entirely absent or very rare, such as albuminaria, diabetes, and obesity.

So accustomed is man to his environment that it is difficult to remove a European from his home in the temperate region to any other, and yet for him to retain health. As a rule, it may be said that it is more easy for both an individual and a race to become acclimatised in a region towards the north of his present habitat. This is, however, only true when the change is brought about gradually. Persons living in the tropics can more readily gradually accommodate themselves to a more temperate climate than can residents in a temperate region accommodate themselves to a tropical residence. We do not require to go to the tropics to witness the unfavourable influence on health of a sudden change from a northern to a southern climate, for it is seen in the effect produced upon patients going rapidly from this country to the Mediterranean health resorts. If patients arrive at these sanatoria before the end of October they meet with a temperature of over 70° F., and the result is diarrhœa, biliousness, and cutaneous irritation, resulting in either urticaria or boils. These effects are due to the violent stimulus the liver and skin receive from the heat, and they could be avoided by taking a longer time in travelling from one place to another. The same thing happens to the inhabitants of a temperate region proceeding to the tropics, only the effects are more pronounced.

It must not be forgotten that European nations vary in the degree to which acclimatisation is possible in the tropics. Southern Europeans become acclimatised in the hot zone more readily than people from the north. In Cuba, for instance, there are now about 800,000 Spaniards, whereas in 1774 there were only about 90,000. Their average death

* It is very difficult to give any definite opinion, as so few deaths are certified, owing to the absence of medical men.

I may here quote a few figures comparing the death rates of various countries, which will illustrate the above remark. The death rate per 1,000 of the inhabitants is in various countries as follows:—

Norway (1888)	16·9
France (1886)	22·23
Italy (1888)	26·8
German Empire (1888)	23·0
Switzerland (1888)	19·9
Ceylon (1886–7)	23·8
Jamaica (1883–7)	22·9
Australia (1888)	14·20
England and Wales (1888)	17·8
Scotland (1888)	17·6
Gold Coast. Europeans (average, 1879–88)	68·08
Gambia (1882)	51·5
British Guiana (1871–83)	33·7
Barbadoes (1886)	25·7

As the death rate varies in different countries so it varies in Colonial and foreign towns. The death rates in a few of these may be given per 1,000 of the population.

Vera Cruz (average, 1878–80)	70·5
Madras (1887)	40·3
Calcutta (1878–80)	31·1
Vienna (1878–80)	29·
Bombay (1887)	26·3
Paris (1887)	23·4
St. Louis (1878–80)	19·3
Glasgow (1887)	23·2
London (1887)	19·6
St. Petersburg (1878–80)	51·4
Rouen (1878–80)	31·3
Mexico (1878–80)	30·9
Chicago (1878–80)	27·2
New York (1878–80)	26·2
Berlin (1889)	23·1
Dublin (1878–80)	30·6
Edinburgh (1887)	19·8
Manchester (1887)	28·7

It is impossible to look at the above figures without realising that it is not climate alone which causes a high death rate, and it is surprising to notice the comparatively low death rates in various tropical districts. If we turn to India and examine some few statistics for the year 1884, we shall notice that the same characteristics obtain. The death rate per 1,000 in the province of Bengal (amongst the general population) was 20·83; Madras, 23·07; Bombay, 24·82; Punjaub, 35·04; N. W. Provinces and Oude, 35·26; Central Provinces, 27·30; Behar, 24·63; Assam, 29·37; British Burmah, 18·95; Mysore, 14·93; and Coorg, 15·08; or an average of 26·44 per 1,000 per annum.

The death rate of the Indian army, as a whole, was 10·50 per 1,000, and that of the European army of India was 12·56 (Bengal, 11·68; Madras, 8·53; Bombay, 19·39. The high death rate in the Bombay district is chiefly due to the high cholera rate among the troops in Afghanistan). These figures show what an improvement has taken place in the health of the European troops in India during the last 20 years, and we find also that the invaliding has reduced in the same way, only 31·74 per 1,000 men were invalided.

It used to be customary to divide the surface of the earth from the equator to the poles into three climatological zones—the hot, the temperate, and the cold; and in like manner we may say that there are, in the tropics, three vertical zones of climate. 1. A zone extending up to a height of 3,000 feet, having a mean annual temperature of 72–83° F., the hot zone. 2. A zone from 3,000 to 12,000 feet, with a mean annual temperature of from 41–73° F., the temperate zone. 3. A zone from 12,000 to 16,000 feet, with a mean annual temperature of from 30–41° F., the cold zone. Each of these zones has peculiarities of its own with regard to the presence or absence of disease, and the higher the altitude of a region (within certain limits) the more nearly it approaches the climate of Europe. As we proceed, however, north or south of the equator, the boundaries of these zones are found at gradually decreasing elevations, and therefore heat, atmospheric pressure, &c., vary at different latitudes.

A few brief and very general remarks must now be made with reference to the influence of these zones upon disease. In the upper or cold zone there is a tendency to plethora. The disorders met with are of an inflammatory character, and the diseases of the respiratory and circulatory organs are far from uncommon. Malaria, yellow fever, cholera, phthisis, dysentery and hepatitis are almost entirely absent. The absence of phthisis is probably due to the rarification of the atmosphere and the absence of yellow fever to the lower temperature, but also on account of the necessary distance from the sea. There are, however, some very rare exceptions to this rule.

The middle zone is, perhaps, best divided into two, which we may compare with the temperate and sub-temperate zones, the cooler (highest) having a mean annual temperate of from 41–55° F., the warmer (lowest) a mean annual temperature of from 55–73° F. In both these areas the seasons exert an influence, and, therefore the presence and prevalence of disease fluctuate, the frequency of diseases of the respiratory and digestive organs, for example, rising and falling correspondingly. But throughout this region, as a whole, diseases specially frequent in the higher and lower zones are less virulent in character.

The lowest or hot zone is the typical tropical disease zone. Here we meet with anæmia, malaria, diseases of the gastro-intestinal tract, hepatitis, dysentery, diarrhœa, beri-beri, dengue, yellow fever, &c. Various diseases are, however, not met with, such as typhus, plague, goitre, cretinism, and so too, for the most part, diseases of the kidneys.

The time at my disposal is not sufficient to allow of my mentioning the physiological effects of a residence in the tropics upon Europeans nor is it necessary:

It is obvious that Europeans going to inhabit the last region I have mentioned *must* be injuriously affected by the climate, and, perhaps, the greatest injurious effect sustained is due to the heat and to the equable temperature, the tonic effect of the cold season being sorely missed, in consequence of which there is a gradual sinking of the vital powers, as shown by the want of energy of Europeans in the tropics. Moisture is the next injurious element, for dry heat is much less injurious to the European than is a hot, moist atmosphere. The soil, too, exerts a not inconsiderable influence. Low-lying clayey soil, soil rich in mould and alluvial soil all acting injuriously; dry or sandy soil being less injurious. If the soil be marshy, temperature is lowered, and it is found that draining the soil will raise the temperature two or three degrees. The drier the soil, the greater the heat during the day and the greater the cold by night, owing to the rapidity with which the soil cools by radiation. In this connexion, too, vegetation must be mentioned, for where it is abundant the temperature will be more equable, the vegetation preventing the sun's rays from heating the ground and also retarding radiation during the night. It may be said that lakes act also in preventing an undue variation between the temperature of day and night.

It is true that much may be done in the tropics to render a climate more salubrious, and sanitary precautions will do a great deal to raise the health of the community. For instance, attention to the water supply at Sierra Leone has had a very marked effect in lowering the death rate; but when all is done, permanent residence for Europeans is out of the question in the low-lying regions of the tropics, and we must, therefore, now consider what advantage altitude provides, and whether it renders at all possible the colonisation by Europeans of any tropical areas.

Areas situated at high altitudes in the tropics are incomparably superior to the low-lying districts. They are, as a rule, entirely free from tropical endemic diseases, and should they perchance be introduced they rarely spread. For instance, in Mexico yellow fever is rarely seen at the height of more than 2,000 feet, and then only after direct introduction. An example may be given. In 1866 there was an epidemic of yellow fever at Guadalupe with a mortality of 66 per cent., whereas in a camp which was formed at an altitude of 16,000 feet, the mortality was only 14 per cent.; and at Matouba, some 700 feet higher, the disease made no progress whatever. In examining the troops stationed in India on the hills or on elevated table lands, we find that the vigour of the men is greatly improved; they regain the healthy appearance they had in Europe, their digestion and the composition of their blood improve greatly, they are able to take a proper amount of exercise, and malaria and diseases of the liver and bowels are almost, if not entirely, absent. I am aware that it has been said that "hill-diarrhœa" is common, as well as rheumatism, but they are probably due to faulty water supply and damp barracks, the former of which is often caused by the too rapid removal of the men from the plains to the hill stations. Nor should it be forgotten, as pointed out by Parkes and

i p. 2596.

others, that the hill stations in India are not in the best sanitary condition possible. Parkes says: "It must be noticed that the evidence given before the Indian Sanitary Commission shows on all, or almost all, hill stations a most lamentable want of the commonest sanitary appliances. At great expense, men are sent up the hills, where everything is, or was, left undone which would make the expense profitable. It appears to be thought sufficient to ascend 6,000 feet to abandon all the most obvious sanitary rules, without which no place can be healthy."

We find that people living in mountainous regions in the tropics are superior to those inhabiting low-lying plains. There is a marked difference between the inhabitants of flat, hot Bengal, where the people are timid, servile, and superstitious, and those living on the high table land of Mysore, where they are brave and courteous but passionate.

Speke mentions that the inhabitants of the northern and higher parts of Uzinza were far more strongly built and energetic than the Wazinza who inhabit the southern and lower parts of the country, and who are so much like the Wanyawesi. I have noticed the same characteristics north of the equator in Africa.

J. B. Fraser calls attention to the strength of the inhabitants of Nepaul as compared with those of the plains; and in Java and in the Malay Peninsula we have further examples of superior tribes living at altitudes of from 4,000 to 6,000 feet.

Sibree says that the inhabitants of the Hova district of Madagascar at an altitude of about 3,000 feet are far more energetic than the inhabitants of the coast district, owing to the cooler atmosphere and the less fruitful soil which compels them to exert themselves; and like instances may be given in North and South Tropical America. For example, the high table lands in Mexico and Peru, although they are less fruitful than the neighbouring areas, having a lower altitude, are inhabited by people who, owing to climatological factors, are in every way superior to their neighbours.

It is not my present purpose to speak of the beneficial results which may be obtained by diseased or debilitated Europeans residing temporarily at a high altitude, but I have to refer to the influence of high elevations on the possible colonisation of such regions in the tropics. It has been stated by some authors that there are various kinds of acclimatisation. I have, however, only to allude to that acclimatisation which enables Europeans to live and work and bring up families. I suppose that all authorities will agree that an altitude of nearly 4,000 feet will be required before we can expect the attainment of this object, and the Europeans who will be able to reside permanently in such districts are the Portuguese, the Spanish, and the Italians. For the British and North Germans, an altitude of from 6,000 to 10,000 feet will be required, and even there the areas for colonisation will need to be carefully selected and all sanitary precautions taken. The typical altitude for these races would be above 5,000 and under 7,000 feet.

Coming to the practical point as to where these areas may be found, we are met with no inconsiderable difficulty, and all I am able to do

Colonization Zones.

is to indicate those regions where it may be advisable for an attempted colonisation to be made. Dr. H. R. Mill (of Edinburgh) has been kind enough to construct for me a map which is, as he says, of necessity somewhat sketchy, but which diagrammatically represents those regions where an altitude is attained such as we theoretically need for permanent colonisation. The temperate zone is shaded with sloping lines. The areas unshaded on the map represent places having a mean annual temperature approximately the same as that of the British Islands, viz., about 50° F. An elevation of 3,000 feet in the tropics corresponds to a reduction of 10° F.; an elevation of 6,000 feet to a reduction of 20° F.; and finally, an elevation of 12,000 feet to a reduction of 40° F. Hence, at an elevation of 3,000 feet the isotherm of 70 corresponds to a temperature of 60° F.; at 6,000 feet to 50°, and at 9,000 to 40°. The area shaded with vertical lines upon the map may be said to be incapable of colonisation by Europeans on account of its low mean annual temperature. In the tropics the areas shaded with horizontal lines indicate those regions where British and North-Germans cannot hope to colonise at all. The areas within the tropics unshaded indicate the places where average northern Europeans could live comfortably without any special precautions. In sketching out these areas, Dr. Mill writes, "I took those areas approximately within the limits of the isotherms of 60° and 30° mean annual temperature. There are, however, rainfall and winds to be taken into account, and this can hardly be done on the map. For example, the Californian coast, on account of favourable wind and rain, is all right, notwithstanding its high temperature, and so are many trade-wind coasts and islands. The south-west of Africa again, although favourable by temperature and elevation, is so rainless that people could not make it a permanent abode."

From what I have indicated, it will be seen that there are comparatively few areas in the tropics where it is possible to prophesy from altitude alone any great success to European colonisation, because although altitude may give an invigorating climate, there will always be certain elements which will detract from its value, viz., the powerful sun, the rarified air, and the absence of a well-marked summer and winter. But I have little doubt that notwithstanding these detractions, there is a certain scope for the extension of European colonisation in the tropics, and certainly, if it is to take place at all, it must at any rate commence within those regions depicted on the map.

The Suitability of Tropical Highlands for European Settlement.

BY

Surgeon-General Sir WILLIAM MOORE, K.C.I.E., Q.H.P.

The value of life in a tropical climate, especially that of the lives of Europeans who remain there, is less* than the value of life in a temperate climate. The reasons are patent. First, there is a direct depressing effect on the nervous system from continued heat.† Then air, expanded by heat, must contain less oxygen in a given bulk,‡ so that less oxygen is inspired. It is also rendered less elastic, and therefore less fitted to dilate the chest. Respiration is slower in a tropical climate when the person is at rest, and it is not so much accelerated by motion and exercise,§ to which the individual is usually less inclined. From such causes less oxygen is introduced into the system. Want of oxidation leads to the formation of fat.‖ The red corpuscles of the blood become studded with particles of a fatty nature,¶ which impair their function of carrying oxygen.** All this results in a lessening of expired carbon.†† There is also, especially in the hot season, as a consequence of increased sensible and insensible perspiration, a diminished secretion of urine, so that there may not be sufficient fluid to dissolve all the effete matter which should be excreted in the urine. This, again, results in the retention of material which ought to be excreted. Such materials represent the ashes of a furnace, and the emunctory organs the bars. If ashes remain the purity of the flame is affected. And so it is in the human system. The result

* The French authority, Michael Levi, states that from the equator to the 20th degree of latitude there is one death annually in 25 inhabitants; from the 20th to the 50th degree 1 death in 35; from the 40th to the 60th degree 1 death in 43; from the 60th to the 80th, 1 death in 50. Dr. Machonachie, the oculist of Bombay, has remarked on senile degeneration, especially of the eyes, occurring sooner among natives than in Europeans. And it has been shown that the average number living at each age-period in India, as compared with England, is altogether in favour of England, after the age of 50.

† Even in a temperate climate a season of extraordinary heat causes languor, debility, and indisposition to exertion by the depressant effect on the nervous system.

‡ 1,000 cubic feet of air at 62° F., when raised to 82°, occupy 1,038 feet.

§ The amount of air passing through the lungs has been estimated at 400 cubic feet in a state of rest; 600 feet in exercise; 1,000 feet in severe exertion. During exertion large quantities of carbonic acid are exhaled from the lungs, from the combustion of carbo-hydrates.

‖ Dr. Lauder Brunton has pointed out this. *Vide* "Disorders of Digestion."

¶ Dr. Forbes Watson showed this years since.

** If from any cause the free and normal aëration of the blood is interfered with, the quantity of hæmoglobin is also decreased.

†† To the extent, as calculated by De Chaumount, of 25 per cent.

is the condition often mentioned as "malarious cachexia," but which is really *anæmia*, meaning impairment and poorness of blood. When the blood becomes impoverished the brain becomes irritable. "The reason calm, the temperate will, endurance, foresight, strength, and skill"—all qualifications for a successful colonist—are reduced to a minimum. It is true that other organs, especially the liver, are excited to increased action whereby some effete matter is expelled. But increased liver action is usually followed by torpidity, torpidity by congestion, and congestion by hepatic deposit, with all its train of evils. There is also another important consideration. Owing to the constant action of the skin induced by heat, this organ becomes extremely sensitive to changes of temperature. A fall of a few degrees in the tropics, makes a greater impression than a fall of many more degrees in a temperate climate, where the skin is not so sensitive, and is protected by thicker clothing. The European in the tropics is, therefore, excessively liable to chill; and chill originates a large number of maladies, certainly favouring, if it does not cause, the fevers of the tropics. The profound modifications in the system produced by heat are, I believe, in some degree hereditarily transmissible. For the children of those who have suffered much from so-called malarious disease are more liable to similar maladies, and children may be born with large spleens, or may suffer from ague before they are born. It is now, therefore, generally admitted that Europeans cannot flourish in the lowlands of tropical countries.

It has been, however, thought that Europeans might colonise the elevated regions of tropical countries; and we have recently heard much of smiling European villages rising on the highlands of tropical Africa. I at once admit that elevation renders bearable, and comparatively agreeable, regions otherwise uninhabitable by Europeans. This is, however, entirely due to the fact that altitude diminishes heat, the rarity of the air admitting of less absorption, and distance from the plains preventing so much terrestrial radiation. There is also often greater movement of air. The actual temperature of elevated regions, however, differs much from what might be inferred from latitude;* aspect, proximity to the sea, rainfall, physical configuration, and hemisphere† being controlling conditions. Hence it occurs that most high ranges have peculiarities of climate, not only as regards temperature, but as regards dryness, dampness, wind-force, and all conditions affecting health. But short of the snow-line‡, the climate is more or less a tropical climate. There is the vertical or almost vertical sun above, giving

---

* Algiers, for instance, is more unhealthy for Europeans than the Cape, but both places are about lat. 35°. New South Wales is more healthy than the East or West Indies, which are at the same latitude.

† At lat. 20° there is a difference of 3·4° F. between the temperature in the northern and southern hemisphere, the southern being the warmer. At lat. 30° there is a difference of 2·9° F.

‡ The snow-line varies much. On the Himmalayehs, for instance, owing principally to the greater fall of rain, it is 1,000 feet higher on the south than on the north side of the range.

however, more heat at some distance from the equator.* There are the characteristic hot, wet, and cold seasons, the two latter being in some localities even more pronounced. But the nearer the equator, the less the cold season. And although there the temperature is more equable, this does not compensate for the absence of the invigorating influence of a prolonged cold season.

In short, the climate of the highlands of a tropical region is the climate of the lowlands, tempered by that diminution of heat obtained by elevation, increased rainfall, and forests. To obtain a mean temperature, as that of London, for instance (51° F.), a person must ascend 10,000 feet in any country where the sea-board has a temperature of 80° F.†

Although such an elevation and temperature are certainly not essential, the evils of expanded air are not escaped at a much lower elevation; for, as ascent is made, the density of the air is diminished by lessened weight of superincumbent atmosphere. It is estimated that on ascending a hill 1,000 feet high, the pressure is reduced by half a pound on every square inch, or 128 lbs. on the average chest alone. At 2,000 feet, by 256 lbs. on the chest; at 4,000 feet, by over 500 lbs. The chest, especially that of young people, often enlarges, during the first period of residence on elevated regions, and probably the lessened pressure contributes to this change. A development which may be regarded as in some degree, but not as sufficiently, compensating for the difference in the amount of oxygen inhaled, which at 6,000 feet elevation is stated by Parkes to be 23½ grains per hour. Ascents in balloons, or of very high mountains, have caused giddiness, nausea, difficulty of breathing, and hæmorrhages.‡ But there are many persons who experience unpleasant effects at a comparatively slight elevation, especially insomnia.§

---

* At the end of the first month after the equinox, the sun has advanced 12° of lat. towards the tropics; in the second month it traverses only 8°, and is 20° from the equator. There remains only 3·5° to be traversed in the third month. The sun recedes in the same way. Hence, at all places between 20° and 23° of lat., the solar rays during two months fall at noon almost perpendicularly, or at an angle at most of 3·5°. A place situated exactly under the equator has only during six days the sun as near its zenith as other places have it during two whole months. The degree of temperature is also increased by the length of the days, which near the equator are 13½ hours, but at the equator always 12 hours. This was known to the ancients, the Greek philosopher Posidonius proposing to regard certain countries as forming a zone intermediate between the equatorial and temperate.

† Other conditions being equal, a place having an altitude of 6,000 feet would register a temperature 20° lower than that of a place in the same latitude at the sea level; one having an altitude of 15,000 feet would have a temperature 50° lower.

‡ The lessened pressure on the body causes the minute blood vessels of the more delicate parts to become dilated, and even to rupture.

§ Such effects are a sense of constriction of the chest, and sometimes of the abdomen. The person feels unable to take a deep breath. Slight exertion causes fatigue, and insomnia is common. Any pre-existing heart affection becomes dangerous, and there is liability to congestion of internal organs.

thermometric scale. An extended table-land, which is required for European colonisation, would be much hotter than a mountain slope of similar elevation, as there would be more radiation of heat from surrounding level ground. I am not aware of a table-land of any extent in a tropical country having the necessary elevation.*

Of the numerous pensioners and others who have settled in India none have been colonists. There is not a descendant of the fourth generation of pure European blood. Many years ago I was asked by the late Sir Henry Lawrence as to the practicability of establishing European colonies on the hill ranges of India. I then stated that it was impracticable, and I have since had no reason to alter my views, but rather the reverse.†

I was afterwards connected for some years, as medical officer and secretary, with one of the hill asylums for European children, founded by the late Sir Henry Lawrence. I found that the physique of the children, especially of females, was, in after-life, much inferior to that of children brought up in England. Tropical climates, whether of the plains or of the hills, produce—especially among Europeans—great infant mortality (something of which, however, must be attributed to ignorance and neglect), anæmia, and sterility. Anæmia must indeed be regarded as physiological in a hot climate, and anæmia renders the subject more liable to any other ailment.

Dr. Hans Meyer, in his recently published work, "The First Ascent of Kilimanjaro," says: "Look where you will through the central "regions of the dark continent . . . . . all alike wear the "Hippocratic face." The temperate climate of altitude may delay the conditions which produce this aspect, but it will not protect from them ultimately. The lower animals and vegetables of temperate climates degenerate, and often die in the tropics, and it is the same with human beings.

An infusion of native blood seems essential to the continuance of the species, and the type of the race becomes the type of that race which conforms best to environment. It is the same with black races located

---

* The table-land of the Deccan, in India, has the mildest climate of the plains of India, its elevation, in some parts, being 2,000 feet; but Europeans cannot colonise it.

† Mr. Isaac Taylor, in his "Origin of the Aryans," points out that the actual descendants of the Aryans, who were a white race, are rare, and are represented by certain princely and priestly families who do no manual labour. Mr. Justin Winsor, in his large "History of America," mentions two temperate districts as being those in which alone "the inhabitants have maintained the original energy of the race that founded the colonies." Dr. Ahearne, President of the North Queensland Medical Society, states that European children in the north or hot part of Australia become pallid, thin, and worn, and exhibit a racial type very different from that of those in the temperate parts. The Dutch have failed to naturalise themselves in Java and Sumatra, and have left no descendants in Ceylon. In the West Indies and New Orleans the French exist, but do not increase. In Algeria emigrants from the north of France fail to become acclimatised, while those from the south succeed better. Peru is still the country of the Incas. No European race has established itself in Mexico, or in Egypt.

in temperate climates. It is authoritatively stated that of negros in the Northern States of America, one out of every four is born deaf, dumb, blind, idiotic, or insane; while the majority are sickly and especially liable to pulmonary affections. I do not mean to say that an European may not live long and enjoy good health on a tropical elevated site; but I say that he must be free from labour under a tropical mountain sun, and especially in tropical mountain valleys, which are generally essentially malarious. His work must be that of superintendence, and not actually manual. But even with these conditions, I say that all experience and reasoning are against an European founding a family, and against his descendants living and retaining their mental and physical characteristics as they do in a temperate climate, whether on tropical plains or on tropical hills. The temperate climate of elevation will not supply the place of the temperate climate of latitude.

Lastly, I venture to remark that, when persons proceed to a tropical climate, often sufficient care is not taken to ascertain if they are fitted for residence in such a climate. Under precisely similar circumstances of climate, men, by reason of their different temperaments and constitutions, suffer in varying degrees from heat. There are certain temperaments and constitutions which a tropical climate suits, and there are the reverse. Diseases already experienced, and hereditary tendency to disease, should also be taken into consideration. Then, there are certain peculiar idiosyncracies which unfit for tropical life; and, as before referred to, there are some constitutions altogether unfitted for elevated sites.

To what extent are Tropical Altitudes adapted for Settlement by Europeans?

BY

C. L. VAN DER BURG., M.D., Laag-Soeren, Holland.

In my capacity as a medical man I must keep to the hygienic side of the question, and in so doing I flatter myself I shall be acting on the behalf of the Congress. For the difficulties which always will arise with regard to pecuniary arrangements, by the settlement of a foreign human race in a country, belong to the subject of political economy; but its importance as to the possibility of that settlement being formed must not be overlooked.

The opinions about the suitability of the hot climate in general as a residence for Europeans have, in course of time, changed considerably.

Vitruvius, who lived in the time of Julius Cæsar, did not believe that the inhabitants of colder regions would be able to live and to work in warmer countries, although he thought, with Titus Livius, that

highlands would be more suitable than lower regions, and he always insisted on the choice of healthy localties.*

In the beginning of the seventeenth century, T. P. Coen, the founder of Batavia, on the Isle of Java, declared that a permanent settlement of Europeans in a hot climate was quite possible, and assured the managers of the East India Company that they would save much trouble and expense by sending a considerable number of men, women, and children (boys and girls) to Java yearly in order to establish colonies there.†

In 1780 Lind wrote, that ignorance and negligence were more often the causes of all the diseases prevalent there than the climate itself‡. Three years later Camper upheld the same opinion by saying "That "the white man, in opposition to the other organised creatures, possesses "the property of being able to live and to multiply in all parts of the "earth."§

Malte Brun suggests that the nerves, muscles, blood-vessels, &c., very soon grow into the condition which is necessary to enable them to endure the degree of heat to which the body is exposed.‖

Both opinions have always had their defenders and adversaries. I intend, however, to fix your attention upon the fact that various attempts have been made, on large scales, to remove Europeans to a hot climate to colonise, but I must also beg you to notice that they have all failed. If economical difficulties have contributed to this result, hygienic difficulties have taken even a larger share in this unfavourable issue, for mortality was very great in the East as well as in the West Indian Colonies.¶

A Committee of State in 1857 in the Netherlands was bidden to inquire into the possibility of colonisation in hot climates, and came to the conclusion that a European living in a tropical region :—

1. Leads a less vigorous life ;
2. Is exposed to more diseases ;
3. Has less chance of living, a shorter average life-time ;
4. Is less fit for vigorous bodily exertions, and by these even risks losing his health.**

---

* *Van Overbeek de Meijer.* Ueber den Einfluss der tropischen Klima's auf Eingewanderte aus höhoren Breiten, U.S.W. (Verhand des X. internat medic. Congres in Berlin, 1890.) *Stokvis.* Ueber vergleichende de Rassenpathologie, U.S.W. (Idem.) *Le Roy de Méricourt* et *Eugène Rochard.* Acclimatement (Encylopédie d'hygiène et de médecine publique, I., pag. 462.) *Jousset.* Traité de l'acclimatement et de l'acclimatisation, 1884.

† *Van der Burg.* Kolonisatie van Nederlanders in Nederlandsch Oost Indië (Vergadering van her Indisch Genootschess te 's Gravenhage, 13 December 1887, pag. 142).

‡ *Lind.* Von der Krankheiten der Europäen in den heissen Gegenden, 1780 (quoted by *Stokvis :* l.c.)

§ On this sentence of *Camper* the attention is fixed by *Stokvis :* l.c., pag. 19.

‖ *Stokvis :* l.c., pag. 18.

¶ *Van der Burg :* Kolonisatie, etc., l.c., (*De Lange* in the discussion on pag. 149).

** Geneeskundig Tydschuft voor Nederlandsch Indie, XVI., pag. 757.

instance, in 1848 only 3 per cent. died in the Dutch-Indian Army;* and, what is also particularly worthy of notice, that these numbers refer both to soldiers who live in the lowlands, as well as to those in the highlands.

It is only about residence in the higher regions that I have to speak. I cannot give you many particulars on this subject. I have in my possession the statistics of the Dutch-Indian Army for a period of 30 years from 1850-79. In that time the death-rate at sea-side places amounted to 13·3 per cent., on an average 7·27 per cent. In places situated in higher localities it was 8·1 to 1·6 per cent., on an average 4·6 per cent., being a little more than half.† I have also found the death-rate for the years 1880–82,‡ and if we add this to the numbers already mentioned, we shall find that in 34 years we have averages of 5·27 per cent. and 3·66 per cent. Also we perceive that the number of deaths during the century has scarcely diminished at all in the higher regions, whereas that of the seaside places shows a much larger decrease, by which we may conclude, that, in Java and Madura at least, the more highly situated places were at the time healthier for Europeans. You are, I presume, already aware of this, yet I trust these few convincing statistics are not superfluous.

Why are those Highlands healthier? Apparently a sufficient answer could be found in the saying of Stokvis, when he speaks of the thermal influence of the tropics: "Highly situated countries and places are no " longer tropical lands and places.§

As far as my knowledge of the tropical highlands goes, I cannot give my whole approbation to this statement. Several of the differences in climate, already mentioned by Waitz,‖ between the tropical and moderate zones remain the same in the highlands; to this may be added the smaller difference between the length of day and night; the little diversion of the perpendicular slant of the sunbeams; the more expanded air; the greater constant moisture of the atmosphere; the brighter day-light. It may be, that in course of time other electric influences will be discovered, and that the longer circuit made by the revolution of the earth on its axis may have some physical influence. Moreover, though it is supposed that on the mountains a permanent spring exists, there is certainly a great difference between such a climate and the effects of the regular *change of seasons* in the moderate zone.

Yet, though the nights may be chill, it is by no means cool in the higher regions. Fayrer says that at Peshawar, in British India, 1,056 feet above the sea-level, the temperature varies from 91° to 52° F., at Balangore, 3,000 feet, 81° to 69°; at Poonah, 1,089 feet, 85° to 72°, at

---

* *Van der Burg:* De geneesheer, etc., I., 2th ed., pag. 275.

† *Van der Burg:* De geneesheer, etc., I., 2th. ed., pag. 276.

‡ In 1880: 3·24 and 1·77 per cent.; in 1881, 6·91 and 4·51 per cent.; in 1882, 3·79 and 3.77 per cent. *Vide:* Gen. Tydsche v. N.T., XXIV., pag. 424.

§ *Stokvis:* l.c., pag. 5.

‖ *Waitz:* De ziekten der kinderen in heete gewesten, etc., pag. XIX.

The complexion grows darker. There is stronger transpiration; the bodily temperature rises from 0·7° to 2° C. The energy of respiration decreases, but the number of respiration increases; also the vital capacity diminishes; men who breathed 4,500 on the spirometer, breathe 3,800 in hot climates.* The pulse augments in frequency and tension. The appetite fails. The secretion of urine falls from 200 to 300 cub. centim. daily;† the liver is more active.

In many cases anæmia arises. Some entirely deny the anæmic state of the blood. Eÿteman‡ and Van der Scheer§ did not find deficiency of the red corpuscles of the blood; but again, Marestang did find it,‖ and the symptoms of that affection are perfectly stated in many cases. By some medical men anæmia is even considered as the normal condition of Europeans in the tropics, and also advantageous to the preservation of health.¶ It is also supposed that residing in tropical highlands would occasion bodily weakness, which is ascribed to the diminution of the pressure of the air,** but that assertion is probably imaginative.

The great humidity of the atmosphere diminishes or prevents the required and necessary emanation of the bodily warmth, and that occasions a feeling of lassitude; therefore little exercise is taken. Here we meet a circulus vitiosus, which is difficult to annul, because one circumstance aggravates the other. It cannot be denied, however, that all these symptoms are not so vehement in the highlands, and that the transition from a moderate to a warm climate is easier when the first residence is in rather a higher region. In the Dutch-Indian Army much good has resulted by taking that precaution during recent decades in Java and Madura; and in the British-Indian Army, acting on the advice of Lind, this measure has also been adopted with much success for a considerable space of time.

For, though Rochond's assertion that two years is necessary for acclimation seems rather an arbitrary limitation, one must agree with him that success in living in the highlands is limited according to the time of residence there.††

French authors are quite right in making a difference between "*acclimatement*," the changes which the body undergoes in order to become able to live in another climate and "*acclimation*," the means which are conducive to these changes. As we contemplate the possibility of a settlement, it is necessary to circumscribe the combination of both, according to the example of Lubach.

Acclimation exists when a human race accustoms itself to live in some other climate than that to which it originally belongs, also when

* *Jousset:* l.c., pag. 156.

† *Glagner* in Gen. Tÿdsche v. N.T., XXVI., pag. 113.

‡ Gen. Tÿdsche v. N.T., XXX., pag. 329.

§ Gen. Tÿdsche v. N.T., XXX., pag. 516.

‖ Archives de médecine navale, etc., 1889, No. 12.

¶ *Saint Vel:* Traité des maladies des régions inter-tropicales, 1868. *Sullivan,* l.c., pag. 3.

** *Jourdanet:* Le Mexique et de l'Amérique tropicale, 1864. He calls that condition "anoxliémie," and considers it as a form of anæmia.

†† Dictionnaire de médecine en 30 volumes, I., pag. 316.

that race flourishes and multiplies under special conditions which are not needed for natives. Naturalisation exists when that race can flourish and multiply without special conditions, like the natives themselves.*

And so we come to the "cardia quæstionis."

For a real settlement naturalisation is necessary, but Europeans have almost everywhere become acclimated only. Great alterations will be necessary before a permanent settlement can exist, even in the highlands of the tropics. Europeans cannot live there as if they were natives, which is necessary to establish a genuine settlement. This is clearly shown by the beautiful and striking words of Stokvis, which have almost become a proverb, viz.: "Der weisse Mann sei auch ein weiser Mann.†" The first act, which he must not neglect, in a trial settlement, is to abstain from field-work. Attention has been drawn by many authors to the impossibility for Europeans to do real field-work in the tropics, that is to say to perform a thorough tillage of the ground.‡ I have pointed out this fact several times,§ and my opinion on this subject is founded on 25 years' experience in Java. It is, of course, impossible to think of affecting a satisfactory settlement, when the first step towards its organisation (agriculture) cannot be accomplished by the settlers themselves. In commencing to establish a settlement there are many difficulties of which I can only now speak briefly.

Nearly all that I have mentioned is relative to man, and favourable statistics are limited when middle-aged men, whose health and constitution were in perfect condition before they left Europe, emigrate to hot climates.

Emigration does not agree with young children; when they are older there is less difficulty.‖ For children under 16, and people above 44 years of age, it is in general injurious to health, and yet men of that age must also emigrate as well as women. Without going into particulars as to the condition of European women in hot climates and the highlands, I may limit myself by observing that the number of deaths among them is less than amongst men; though on the contrary they suffer more from heat, humidity, fatigue, home sickness and mosquitos. These causes, taken together, occasion anæmia, neuropathies, menstrual disturbances and uterine affections,¶ which render European women unable in helping to establish a permanent settlement.

---

* *Van der Burg:* De gencesheer, etc., II., pag 140.

† *Stokvis.* l.c., pag. 9.

‡ *See* f.c., the advice given by the Society for Advancement of Medical Science in Dutch-India, in Gen. Tÿdsche v. N.T., XVI., pag. 761 and 760, and *Van Overbeek de Meÿer:* l.c.

§ *Van der Burg:* De geneesheer, etc., I., 2th ed., pag. 348. *Van der Burg:* Kolonisatie, etc., l.c., pag. 144.

‖ *Van der Burg:* De geneesheer, etc., I., 2th ed., pag. 318.

¶ *Van der Burg:* De geneesheer, etc., 2th ed., pag. 314. *Le Roy de Méricourt* and *Eugene Rochard*; l.c., pag. 448.

Though it is stated that creole women are more precocious in physical development, and that their catamenia appear earlier,* these women are sooner faded, and consequently men generally prefer the native women, who are healthier and easily to be had; which doubtless prevents a real European settlement.†

The question of the possibility of the propagation of pure Europeans is not yet solved. In Dutch-India I could not with certainty state that the results went further than three generations; but a regular propagation seems to me to be very possible,‡ and Stokvis mentions creole families in the West Indies whose settlement doubtless goes back to the 17th century; accurate data fail. § Waitz is convinced: "that "it is possible to establish a race of European children in the tropics, "which after a few generations will be able, for the most part, to support "the same bodily fatigues as the original inhabitants,"‖ and he even finds nature assisting to produce that result. The words "for the most part" make the sentence a wise one.

In conclusion let me make one remark on labour. We have already seen that by preference little work should be done. Labour is good, but too much labour injures the health,¶ especially in the tropics. Too great fatigue is more injurious even than too much rest.**

When all this is considered, I think the possibility of a European settlement in the tropical highlands as physiologically conceivable, provided many hygienic measures are taken, and field-labour on a large scale be excluded, though gardening only be allowed.†† Such a settlement, however, ought to be continually supported by new supplies from the European continent, for many, possibly for hundreds of years, in order to have a chance of healthy existence, in the same way as the Boers in South Africa live now-a-days. Men grow by degrees accustomed to hot climates.

The establishment of the settlement itself, however, I consider as impracticable for economic reasons, which cannot be discussed here.‡‡

---

* *Fayrer:* l.c., pag. 335. *Van der Burg:* Tet. over den tyd van het ontitaan der memtruatie bij in Indië geboren Europeesche meisses; in Gen. Tydsche v. N.T., XIX., pag. 121. *Van der Burg:* De geneesheer, etc., I., 2th ed., pag. 322.

† *Van der Burg:* De geneesheer, etc., I., 2th ed., pag. 317 and. 348. *Van der Burg:* Kolonisatie, etc., l.c., pag. 142.

‡ *Van der Burg:* De geneesheer, etc., I., 2th ed., pag. 342. *Van der Burg:* Kolonisatie, etc., l.c., pag. 138.

§ *Stokvis:* l.c., pag. 24.

‖ *Waitz:* l.c., pag. 105.

¶ *Marfan:* Du surménage physique et ses effets morbides, in Revue d'hygiène thérapeutique, Mars 1891, pag. 82, etc.

** Encyclopédes d'hygiène et de médicine publique, I., pag. 454.

†† Gen. Tydsche v. N.T., XVI., pag. 763. *Van der Burg:* De geneesheer eng. I., 2th ed., pag. 348. *Van Overbeek de Meijer:* l.c.

‡‡ *See*, for instance: *Van der Burg:* Kolonisatie, etc., l.c., pag. 144. *Kielstra:* Kolonisatie in onse Oost (in De Tydspiegel, 1891, No. 5, pag. 43.)

CONCLUSIONS.

I. The settlement of Europeans in tropical highlands is physiologically conceivable.

II. Field-labour should be excluded.

III. Permanent settling and propagation (colonisation), will, probably, not be accomplished till after several centuries have elapsed.

IV. For economic reasons such settlement is at present not practicable.

On the Suitability of Mountainous Regions and of Islands in the Tropics for European Settlement.

BY

CLEMENTS R. MARKHAM, C.B.

The questions as to whether the mountains and islands of the tropics are suited for the continuous residence of generations of people of pure European descent, and whether such inhabitants would suffer mental or physical deterioration, from the point of view of established facts only. They are surrounded by difficulties due mainly to the absence of all experience as regards some regions and to the want of reliable statistics as regards others. It is, therefore, best, in the present state of our knowledge, rather to take stock of our present meagre knowledge with a view to further research than to attempt to form decided opinions.

The various mountain systems of the tropics require separate consideration and separate treatment, because they differ widely from each other in extent, in the height of the fever line, in soil, rainfall, and other circumstances which affect the health, physical condition, and general welfare of their inhabitants.

It will be found that the history of the tropical mountains of the old world furnishes little or no information to help us in our inquiry, because they have either not been settled at all by any European race or they have been settled for too short a time to supply any useful deduction.

The Cameroon Mountains, on the western side of Africa, offer some land, at a height of 7,000 feet above the sea, but it has not yet been thoroughly explored and no settlement has been formed on it.

On the eastern side of the African continent the mountainous region is far more extensive. The whole mass of high land embracing the Abyssinian highlands, the little-known region immediately to the south, Kenia, Kilimanjaro, and Ruwenzori, may probably be considered as a continuous lofty plateau, and in that case it is of vast extent; but

there is very little accurate statistical information within our reach relating to any part of it except Abyssinia. This Abyssinian plateau, from 8,000 to 9,000 feet above the level of the sea, certainly enjoys a delightful climate, apparently well adapted for European settlement. It has been known to European travellers for upwards of three centuries; many Europeans have passed the greater part of their lives in the country, and 14 children of pure blood were born in Theodore's time.* But they did not remain in Abyssinia, so that we have no materials for forming a judgment respecting the adaptability of the mountains of Western Africa for European settlement.

Turning eastward, we next come to the western ghauts of India, the Himalayas being outside the tropics. The northern portion, in the Bombay Presidency, is deficient in height and width, and is exposed to the heavy rainfall of the S.W. monsoon. The Nilagiri hills are free from these objections. Rising to a height of 8,600 feet they have an area of 200,000 acres well above the fever range, with a mild and delicious climate and a moderate rainfall of 50 to 60 inches. But here, again, the country has been occupied by Europeans for so short a time that there are no facts sufficient to enable a conclusion to be formed respecting the Nilagiri hills. It is only 70 years since the first house was built by Mr. Sullivan at Utakamand, and though many European children have been born and even brought up on those charming hills the time is insufficient to furnish us with conclusive details as to the possibility of continuing the European race there permanently and without loss of physique and other deterioration, but medical opinion is against it. If British India fails to help us in this interesting inquiry we cannot expect fuller information from the hills of Burma and Malacca, from Madagascar, Ceylon, New Guinea, and the Eastern Archipelago. In Java it has, I am informed, been ascertained that Europeans cannot exist longer than for three generations. The tropical portion of Queensland has not been colonized long enough to afford material for our discussion.

This rapid glance over the tropical hill regions of the Old World seems to prove that we must look westward for the necessary data. In America there is a mountainous region extending almost continuously from tropic to tropic and of great width, containing numerous cities far above any deleterious tropical influences and with areas sufficiently extensive to sustain large populations. The region of the Andes has been inhabited by people of European race for upwards of 350 years, so that here we might fairly hope to find information which would throw light on the subject we are discussing. Yet even here it will be found that it is very difficult to obtain facts in sufficient number and of the needful accuracy to enable us to arrive at really reliable conclusions.

A great deal has been written on the subject of the effect of American conditions upon the peoples who have come from Europe

* One child of Mr. and Mrs. Rosenthal, four children of Mr. and Mrs. Flad, five children of M. and Mme. Bourgaud, four children of M. Zander, the rest half-castes.

to live a life of many generations in the New World. The problem is a very complicated one, for it is difficult to separate the effects of climate from those brought about by diversity of habits of life and of food. As regards the United States it has been treated in a masterly way by Professor Shaler of Cambridge, Massachusetts. But the States are outside the tropics, and I only feel justified in alluding to the seaboard Slave States as being nearest to the tropic of Cancer. As regards the people of English descent in those States the average of their weight, as given by Mr. Shaler, is equal to that of Englishmen within 4 lbs., the average of chest capacity is equal within a decimal, and the average height is considerably above that of Englishmen. So far as these statistics go they favour the hypothesis that descendants of Englishmen have not deteriorated on the verge of the tropics.

The lofty region extending from the northern frontier of Mexico to the southern limit of Peru, and broken only at the Darien Isthmus, is the only quarter whence we can derive information which will yield us even an approximate answer to the question under consideration. Mexico may well be compared with Italy and Spain as regards climate, the plateau being 7,000 to 8,000 feet above the sea, and owing to the narrowing of the distance between the oceans enjoying a better climate than the dry region to the northward. To the south and east the lowlands gradually gain on the plateau until south of the Tehuantepec Isthmus, and as far as Darian, the whole region is unfit for the uses of a European people. But in South America the plateau at once resumes its lofty character: and for a distance of 2,000 miles there is a cool and temperate region, a great part of which is admirably adapted for the growth and raising of all kinds of food required for the development of a healthy European race.

On these lofty highlands descendants of Europeans have been established, as I have said, in considerable numbers, for upwards of three centuries and a half. In Peru, which is the Andean country of which I have the most personal knowledge, the number of pure-blooded Europeans, according to the census of 1793, was estimated at 136,300. Since that date, no careful attempt has been made to enumerate the different races separately. Europeans have been arriving ever since the conquest, and there has been an immense admixture of Indian blood. The Incas were a civilized people, the marriages with Spaniards were numerous from the first, and while in Virginia we only hear of the single marriage between Mr. Rolfe and the Princess Pocahontas, in Peru several Spaniards of the highest rank took Inca wives. At the same time others retained the purity of their blood; and here we may seek an answer to our question as to what influence a residence in a mountainous region, within the tropics, for several generations, has had upon their descendants. I do not myself believe that man is, in a direct way, greatly affected by mere temperature; I agree with Mr. Shaler that his adaptable body aided by the precautions suggested by experience, may, within certain limits, defy this element of climate. The real question is how far temperature and rainfall affect the products of the soil upon which his well-being depends. Now, on the Peruvian highlands, there is a climate

not only admirably adapted for the healthy growth and development of Europeans, but for the production of all the food supply that they need.

The difficulty is to find the Peruvians of pure European descent whose progenitors have lived in the tropics for several generations. There is, of course, the same difficulty as regards every other peoplel Each one of us had 256 progenitors eight generations ago, and to ascertain the nationality of every one of these even as regards one individual would, in most cases, be an impossible task—how much more if those of a number of people were required, whence to derive an average. But there are in Peru, as in Europe, a certain number of reliable pedigrees preserved, with descents from the end of the 16th and early part of the 17th century, and with marriages showing at least European names in each generation. With this we must be satisfied, at least for the present. A considerable number of such pedigrees are in existence. I have seen and examined five, and I possess one.* Moreover I have been acquainted with the living representative in each case. In one instance the original settler in South America was an Italian, in three others he was a Catalonian, and in two he was a Basque. I can, therefore, speak from personal knowledge respecting six families which have been settled on tropical highlands for upwards of two centuries, and are, so far as it is possible to ascertain, of pure European blood. In these instances there has certainly been no deterioration either physically or mentally. The height, the chest development, the fresh complexion, the powers of endurance are all well maintained. The homes of these families are in or near cities at heights of from 8,000 to 12,000 feet above the level of the sea, their members have led out-of-door lives, and have been well nourished on practically the same food as sustained their ancestors in Europe, with the addition of maize and potatoes. A more extensive investigation would considerably enlarge the number of such families, not only in Peru, but also on the plateaux of Quito, Bogota, and Mexico. It must, however, be admitted that, in by far the greater majority of cases, there is more or less admixture of Indian blood in the South American families of European descent; while, on the other hand, fresh blood from Europe has continually arrived throughout the period of settlement in the New World.

There are German and Basque colonies in the Peruvian highlands, but they have not been established there long enough to enable us to form conclusions from their experiences.

The data on which we are able to base even a provisional conclusion are meagre and far from satisfying. Still they are far and away more satisfactory than any that can be furnished respecting any of the other mountainous regions of the tropics. Such as they are, the conclusion I derive from them is that, under favourable circumstances, the mountain systems which cover large areas in the tropics are well adapted for the healthy growth and development of generations of Europeans of pure blood. The climate is suitable, all the food supplies most conducive to their well-being are cultivated and raised, and we have at least some proof

* *Tello y Cabrera, Astete, Novoa, Quiñones, Ochoa, Justiniani.*

of the fact that European settlers do thrive for generations on tropical plateaux of large area. My impression is that isolated or knife-like mountainous regions of comparatively small area in the tropics may be, and no doubt are, well adapted for sanatoria, but that they are not suited for continuous European settlement, because they are too much under the influence, in various ways, of the adjacent low lands.

PEDIGREE of the PERUVIAN BRANCH of the JUSTINIANI FAMILY.

The suitability of the numerous islands in the tropical seas for European settlement is a question so closely allied to that of the mountainous regions, that it cannot well be overlooked. The fresh sea breezes enjoyed by islands offer great advantages which may or may not be counterbalanced by other less favourable effects of their positions. But it is difficult to believe that Europeans are unable to form permanent settlements under the delightful climates of Tahiti, the Sandwich Islands, and other Pacific groups. I have myself known men of pure English parentage who were born and brought up at Tahiti and other islands, and whose moral and physical development was quite equal to that of their progenitors. But I am not aware of instances of residence in any of the Pacific Islands for more than three generations.

There are, however, very remarkable instances of the settlement of white people in the West Indian Islands, not only at Barbadoes, but also at Tuagua, one of the Bahamas to the north of Hayti, and within the tropics. The people formerly known as "red legs," and now more commonly as "poor whites," in the island of Barbadoes, are of perfectly pure blood, and have resided in the tropics for two centuries. They are the descendants of rebels who were sent out to be sold as slaves

between the years 1650 and 1700. They have not only lived in the tropics since that time, but they have survived under the most disadvantageous circumstances. At first they were so cruelly treated that their numbers were reduced from over 7,000 in 1683 to 2,300 in 1698. They were, in many instances, people of good position, and among those who were sent out after Penruddock's rising at Salisbury in 1656, there were country gentlemen, officers, and clergyman. They were employed in menial outdoor work under a scorching sun, and ill-fed. Again, 1,800 prisoners were sent out after Monmouth's rebellion. These people were reduced to a state of the most abject misery. Yet they survived and brought up families, and the present native white people are their descendants. They have, no doubt, deteriorated considerably in stature and general physique, but it is probable that this is due quite as much to their poverty as to the climate. The children look healthy, and well grown, but the parents are wretched in appearance. These "whites" of Barbadoes are mostly fishermen, which is, of course, a precarious means of earning a livelihood. They are badly fed and clothed, and such conditions would have told upon their physique in any climate. As a rule, they have fair hair and blue eyes, and though they are sunburnt from their occupation, they become very pale after quite a short spell of indoor life. Their number is well under 3,000. In considering the case of these Barbadoes whites it is necessary to remember their origin, the sufferings of their ancestors, and their own poverty. They have continued to live for generations on an island in the tropics, in spite of these disadvantages. Sir Henry Norman, when he was Governor of Jamaica, visited the island of Tuagua, north of Hayti, and found English families which had been settled there since the time of Charles II. He has written a very interesting account of them, and it would appear that they have not suffered under the same disadvantages as the white people at Barbadoes.

Islands in the tropics assuredly do not offer the same chances for European life as mountainous regions, even under the most favourable circumstances. In spite of cool sea breezes, they are exposed to several conditions conducive to fever, while they cannot produce the kinds of food which are best suited to promote the health and well-being of Europeans. Yet, in the face of these drawbacks, and in spite of other unfavourable conditions, we have an interesting instance at Barbadoes and Tuagua of white people maintaining existence for several generations. It may well be doubted whether, if the circumstances in other respects had been more favourable, the experiment would not have been more successful.

With these meagre materials to draw a conclusion from, my own provisional opinion is, that people of pure European race, under favourable circumstances may settle in tropical mountainous regions of wide extent and continue there for generations without physical or mental deterioration; and that they may continue to live for generations on some favourably situated tropical islands, but not without deterioration.

The Growth and Development of Anglo-Indian Children.*

BY

Dr. G. M. Giles, in Medical Charge of the Lawrence Military Asylum, Sanawar, Punjab.

So far as I know, there are in existence no statistics bearing on the growth and development of Anglo-Indian children, and I have here an excellent opportunity of making observations on the subject. This is a large school for the children of soldiers, our average strength ranging from 450 to 500. For a long time the heights and weights have been taken on admission, and lately the children have been weighed and measured every six months. To this I have added measurements of the chest and of the eye-sight. . . . The majority of the children are of pure European descent, but we have also a large number of Eurasians of all shades, a few being almost pure natives. Nearly all, however, have been born in India. . . . Personally, I am inclined to doubt if there be any marked differences between children reared in India and in England; at any rate, if they get a fair share of the hills. The fact is, that the notions that have sprung up on this point are without exception the result of desultory general observation, entirely unchecked by the numerical method. Take the oft-quoted statement that you cannot find a single fourth-generation European raised in India, and the deduction thence that Europeans deteriorate in India. Where are you to find such a case amongst people of our habits? The darkest Eurasian will always speak of England as "home," and if he can only get the money will go there himself and send his children there to be educated. Now, a family too poor to send their children home is hardly likely to keep up a family history going back many generations, and if they know all about their grandfathers it is as much as can be expected. Few middle-class people, even in England, can go beyond their great-grandfathers. Hence the statement, though probably true, will not bear the deduction; as whatever the influence of climate may be, the fact depends on the social customs of Anglo-Indians, which are such that it is scarcely conceivable that one should find a family that could give an authentic history for four generations and had yet been so poor as to be unable to have its children brought up at home for a more or less considerable portion of their rearing. To say nothing of the fact that it would be practically impossible for such a family to find other similar families quite free from Asiatic [blood] with which to intermarry through so many generations. There are such large numbers of Eurasians of all grades amongst the regularly domiciled families, that in the course of 100 years [the descendants of] an originally pure European family would be sure to marry some girl with more or less [native blood], the more so as it is often impossible to detect [it]. I have in my mind a very fine young girl amongst our elder pupils. She has a

* Extract from letters to Mr. F. Galton.

mass of bright red hair, with a brilliant complexion, is 5 ft. 6 in. high, and weighs 140 lbs., not bad for 15. Yet her own brother is obviously an Eurasian. I am sure no one would be disposed to dispute her assertion of unmixed European descent did she choose to make it. The fact is, [that] from the nature of the case it cannot occur, and so cannot be tested.

DISCUSSION.

Prof. B. J. Stokvis (Amsterdam) said:—The first point to which I will call your attention is the question of tropical anæmia. What is the signification of anæmia? In pathology, anæmia is that condition of the blood wherein red corpuscles, and especially hæmoglobine, are diminished. Now, if you examine the blood of a tropical man with a pale face, pale lips, &c., you will find a normal number of red corpuscles, a normal hæmoglobine rate. And these researches have been made as well in New Caledonia, as in Java, as well in Europeans as in natives. So we must no longer speak of anæmia, and if we speak of tropical anæmia, we must know that it is only a special condition of the vaso-moter system, by which the greatest portion of the blood is accumulated in the interior of the body, and which has nothing to do with any diminution of tissue change.

The second point is the question of the propagation of Europeans for more than three generations in tropical climates. Now I am convinced that when you seek only in healthy tropical climates, whether in tropical islands, or in tropical highlands, you will find the same thing as in the islands of the Carnatic Sea, where all colonising peoples, Spaniards, Frenchmen, Dutchmen, Danish, Englishmen, have succeeded. In the only places of which I can personally speak—the Dutch West India colonies—pedigrees are to be had of true European families, persisting for almost three centuries, without the introduction of a drop of native blood. Finally, the chief point to which I would call your attention is this. All living organisms are moulded by the external conditions in which they are placed. And so Europeans must know that if they will settle in the colonies from generation to generation, they cannot expect to remain what they were: they must deteriorate, they must become more and more equal to the native. If they would remain Europeans in the true sense of the word, they must repatriate themselves from time to time, and experience that favourable influence of our moderate climate, which gives a man so much energy in both body and soul.

Dr. Ewart thought that too great importance had been ascribed to the mere fact of reduction of temperature. Many other factors were concerned. If colonisation in the tropics had been practicable on a large scale, surely it would have been carried out ere this. But such settlements are purely artificial in Asia, especially in India; no outdoor work is done, and yet a majority of the settlers have to send their children to Europe. This is very regrettable politically, but none the less a fact. Apparently there is no prospect of turning these hill districts in tropical climates to permanent use for colonisation proper.

Dr. Milliet (Berne) said:—In Dr. Felkin's paper allusion is made to the causes of death in the higher Swiss valleys. I wish to point out

with the close relation that the *high* and *low* mortality from some causes of death bore to certain well-marked geological features in the localities where these causes either prevailed or were infrequent. After completing my heart disease and phthisis maps, at the instance of the London Medical Society in 1868 I investigated the distribution of cancer among females in England and Wales, and whilst engaged in constructing the map illustrating the results, I was then forcibly struck by the close relation that the *high* and *low* mortality districts bore to the geological character of their areas. It became evident, after further investigation, which I have continued up to the present hour, that the medical geography of certain fatal malignant diseases among females, which have been certified by qualified English medical practitioners as *cancer* in some one of its forms, would be a valuable contribution to the natural history of that dreadful disease, not only because it showed a preference for certain haunts which could be defined, but because it further showed that within those very haunts there resided a something associated with the presence and malignity of this dread disease which was capable of being influenced by certain geological formations; for it is evident to anyone examining the map of the medical geography of cancer among females that the *high* mortality districts are always more or less associated with certain hydrographic and geological features, such as floods and clays; whilst the *low* mortality districts are comparatively on high ground, not subject to floods, and mostly characterised by calcareous rocks. One of the functions of the medical geographer is to ascertain where certain diseases prevail, and to indicate those areas on his map as guides to other investigators who have opportunities of studying the causes of such prevalence on the spot, as well as to others who are studying the natural history of such diseases, and especially to those engaged in bacteriology; and lastly, to the busy medical practitioner who requires to know *at once*, for the sake of the patients who consult him as to where they ought not to reside if they would avoid the diseases they dread, and where are to be found the localities in which there is the greatest chance of escaping them.

The facts which drew my attention to this subject first were as follows: (1) In 1868 I showed, by means of the map of the Geographical Distribution of Cancer among Females at all Ages, during the ten years 1851–1860 (*a*) that the groups of districts having the lowest mortality from these causes were to be found where the *limestones and chalk* characterised the sites; and (*b*) that, on the contrary, the highest mortality was to be found where the clays of different formations abounded and were subject to be flooded by the *extravasated* waters of fully formed rivers. (2) In 1875, in the first edition of my work on disease distribution, I drew attention to the remarkable fact that cancer among women did not thrive in *chalk districts*, and referred to the infrequency of this disease where this formation predominated. Thus I remarked that "the essentially chalk county of Hampshire is remarkably free from "cancer where this formation predominates; its rivers, the Test and "the Itchen, have their origin in the chalk hills; they are genuine "rivers of the chalk and possess these remarkable characteristics from

It is a matter of fact that among plants we find certain species that really only *thrive* on *chalk* and calcareous soils, appearing every now and then in heavy clayey soils, and we wonder how these individual specimens found their way there, feeling sure in our own minds that their surroundings were not the result of choice nor in harmony with their instincts. Again, in our rambles we find a clay and moisture-loving plant every now and then rooted in a dry limestone soil, looking certainly out of place, and in a condition which we could not term thriving. Since land plants first appeared on the earth, some have been forced away from their ancestral homes to live as best they could on sites and amidst surroundings differing *toto cælo* from those of the homes where their early parents throve in ages past. Darwin has taught us with what results. With clays we associate impermeability to, and retentiveness of, moisture; with limestones, on the other hand, dryness and permeability are connected in our minds. In geological history, life dawned amidst surroundings in which carbon, oxygen, lime and water held sway (limestones), not where silica, alumina and water (clays) predominated. Nor was the dawn of life associated with the silica that formed the vast accumulation of sandstones. Every great geological period, from the Archaen to the Recent, has been characterised by either sandstones, clays, or limestones. The Archaen rocks were subjected to decomposition and disintegration, and in the sequel yielded the material for Cambrian and Silurian clay, slates, grits, and sandstones. Limestones appeared in the Bala and Coniston beds of the Lower Silurian. Then followed the mountain limestone of the carboniferous period, the magnesian limestones of the Permian; and in succession, the limestones of the Lias and the Oolite, and, lastly, the Chalk. The geological map before us gives us a picture of the sedimentary and other rocks with which these limestones are connected in England and Wales. In the oldest rocks the clays are indurated, folded and changed by pressure and heat, and have lost their plasticity. They, however, are subject to *decomposition*, to the action of sub-aerial influences, and under them return again to clay, which is washed down into the lower lands. The granites, too, which have been intruded into their rocks, where exposed by denudations, are subject to similar decomposition, and the hydrated silicate of alumina of their felspars forms clays which eventually find their level in the valleys.

If we pass on to the Mesozoic or Secondary period, we find the Lias yielding clays for bricks and tiles, the Bradford clay of the lower Oolite, the Oxford clay of the middle, and the Kimmeridge clay of the Upper Oolites—the two latter are found crossing the valley of the Thames, in which also are found the Weald clay and Gault clay of the Cretaceous series, and the London clay of the Eocene; and covering the great part of the valleys in the north of Great Britain is the boulder clay. Clays and limestones, therefore, are important factors in the structure of our country, and must, from their widely differing physical and chemical characters, be connected with widely differing effects on the lower air of our atmosphere, in which are found resident those invisible but potent influences which affect not only the cellular structure,

wide enough to admit a man's leg in many places, and these gaping chasms render great caution necessary in walking over this weird sculptured pavement. It is evident from what has just been described that the limestone has neutralised the acids that have been formed by the vegetable decomposition, which first took place at the surface of the slabs; and as the drainage of the carbonated rain-water rendered more acid by decomposition first marked out the courses of the flowing acid water, so in the sequel were these courses preserved until, by gradual deepening, they were able to afford shelter to the blown leaves that fell from the trees around, until they were piled up into rotten masses of acid-forming material.

The great lesson that this interesting locality teaches us is that one of the chief functions of limestone is to neutralise the acid products of vegetable decomposition, and that this function is more or less well fulfilled whenever it is required; that it matters not whether the evil to be counteracted arises from a mass of dead leaves lying sodden on its surface, or from the results of a widespread flood covering many square miles.

I will now give the facts which have, in my opinion, a special bearing on the influence of clays and limestones on the geographical distribution of cancer among females as an illustration of the subject.

In 1868, I constructed a map showing the geographical distribution of cancer among females at "all ages" during the ten years 1851–60. In that map certain areas are coloured in different shades of *blue*, the darkest blue representing the highest death-rate from this cause, whilst the other areas are coloured in different shades of *red*, the darkest red indicating the lowest death-rates. In the Thames basin there will be found five groups of districts which follow the river in its course, and are either bounded or traversed by it. The highest group (1) consists of districts below Oxford, more or less characterised by clayey soils and subsoils; superadded to which are alluvial clays and river gravels. This group consists of the following districts—Wallingford, Bradfield, Reading, Wokingham, and Henley—which in this map are coloured blue so as to indicate a death-rate from cancer *above* the death-rate of England and Wales for 1851–60. (2) The next group consists of Cookham, Windsor, and Wycombe, or such districts as are remarkable geologically for the outcrop of chalk that takes place within them, this formation, which is a carbonate of lime, prevailing over the greater part of the area which forms the group. Coincident with this geological fact is the medical one, that within this area the death-rate from cancer was *below* the annual average of the country. This group is coloured red, indicating that it is a *low*-mortality group. Between this group, which hereafter will be known as the Chalk group above London, and London itself, is a third (3) group consisting of Kingston, Chertsey, Richmond, Brentford, Staines, and Eton—all more or less lying upon the London clay. It is coloured *blue*, and contains a mortality above the average. (4) The fourth group consists of the division of London and the districts of

every 10,000 females living. We will just compare the death-rate notes of the two decennial periods separately.

Groups.	1851–1860.	1861–1870.
1. Clay	17·83	19·32
2. Chalk	12·41	17·26
3. Clay	16·95	18·57
4. Clay	16·68	19·44
5. Chalk	11·02	14·88
Clay groups	17·15	19·16
Chalk groups	11·71	16·07

For the two decennial periods, 1851–1870, the death-rates are as follows:—

	1851–1870.
1. Clay	18·58
2. Chalk	14·97
3. Clay	17·86
4. Clay	18·18
5. Chalk	13·08
Clay groups	18·21
Chalk groups	14·02
Difference	4·19

so that the death-rates on the chalk amounted to 22·9 per cent. less than those on the clays during the twenty years 1851–1870.

The chalk country of Hampshire will now engage us for a short time.

In the map of deaths from cancer among females at "all ages" during 1851–1860, it will be seen that the group of districts drained by the rivers Test and Itchin is coloured red, so as to indicate a low mortality from cancer. The districts comprised within this group are Romsey, Stockbridge, Winchester, Alresford, Whitchurch, Andover, and Kingsclere, having a total mean population of women above 35 years of age of 13,551 during 1851–60, and of 14,327 during 1861–70. In the former decennial period the annual death-rate among women amounted to 10·06, and in the latter to 12·49 to every 10,000 women living. Thus we have the following death-rates in a group of districts lying mostly upon *chalk* in Hampshire:—

	1851–60.	1861–70.
Hampshire group	10·06	12·49
England and Wales	12·98	15·63
Difference	2·92	3·14

[i] p. 2596.

These figures give us some idea of what has taken place all over the country, and are of a sufficiently decisive character to demand their being well weighed whilst studying the natural history of such a disease as *cancer*.

The difference in the death-rates among dry and flooded districts is too evident to be passed by unheeded. The difference of over 30 per cent. is too striking not to demand investigation.

I believe that such maps as I have had the honour of submitting to this Congress tend to draw the attention not only of the student of demography and medical geography, but of the medical practitioner to the very localities where the causes of prevalence or infrequency of certain diseases are to be found. Such maps, too, in the practice of *preventive medicine* are indispensable, when the medical practitioner is asked the all-important question by patients predisposed to certain diseases where they, their children, or those in whose welfare they are interested, similarly predisposed, should live, so as to give the dreaded malady the last chance of developing into a fatal form.

The Influence of Geology upon Health, and upon the Distribution of Disease.

BY

W. Topley, F.R.S., Assoc. Inst. C.E., Geological Survey of England.

The author illustrated his remarks by reference to the maps of the Geological Survey, on which the superficial deposits are now shown in detail. The south-east and the north-east of England were the areas mainly discussed.

The physical features of a country are controlled mainly by the geological structure. These, with the nature and range of the surface soils, have been the main causes in determining the distribution of the population, strata which are light, porous, and fertile being those first settled. Here arable soil occurred, and water could be obtained. Incidentally reference was made to the same causes in determining the parish boundaries. The influence of geology in controlling the water supply of a district was referred to.

The author then described the distribution of certain diseases in the south-east of England. Dr. G. Buchanan has shown that, as a rule, wetness of soil is the main controlling factor in the distribution of phthisis. Dr. Kelly has shown, for West Sussex, that certain local anomalies in this generalization, recognised by Dr. Buchanan, are largely removed if to wetness of soil we add bleakness of situation. Wetness of soil seems also to cause diphtheria, which is especially prevalent over the wet clay-soil of Sussex.

Some remarks were made upon the distribution of goitre, as to the geological relations of which very contradictory opinions have been expressed.

die Möglichkeit nicht ausgeschlossen, dass die Krankheit gelegentlich mal in stärkerem Grade nach Europa eingeschleppt würde und sich dort verbreite. Es scheint deshalb nur eine Pflicht der civilisirten Welt gegen sich selbst, den Spuren der Krankheit nachzugehen und Mittel und Wege zu suchen, sie einzudämmen und womöglich auszurotten. Wenn nun auch die Erscheinungsformen dieser Krankheit heute sorgfältig studirt sind und werthvolle Studien über den Bacillus von vielen Seiten vorliegen, wobei ich nur ausser den früher genannten noch an Hillis, Kaurin, Köbner, Unna, und Dr. Arning erinnern möchte—der wie jetzt Dr. Lutz, lange Zeit in Honolulu diesem Studium speciell oblag, so sind doch noch viele Puncte im Betreff der Aetiologie und Verbreitung der Lepra unaufgeklärt, und man kann nur auf das Lebhafteste wünschen, dass die von dem Englischen Comité zur Erforschung der Lepra nach Indien entsandte Commission in diesen Fragen zu definitiven Resultaten kommen möge. Daneben hat aber wohl jedes Land die Pflicht, der Lepra bei sich nachzuforschen und jeder, den Gelegenheit oder Stellung dazu beruft, soll sein Scherflein zu ihrer Kenntniss beitragen. In diesem Sinne möchte ich in Folgendem über das Ergebniss einer Enquête berichten, welche die Sanitäts-Direction auf meine Veranlassung im vorigen Jahr in Egypten veranstaltete.

Es war eine schon dem Alterthum wohlbekannte Thatsache, dass die Lepra in Egypten heimisch sei. In der That reicht die Kenntniss derselben bis in die Uranfänge der Geschichte Egyptens zurück. Wenigstens führt Brugsch in seiner "Histoire de l'Egypte" an, dass nach einem Berliner Papyrus schon unter dem 5. Pharao Heilmethoden für die Lepra aufgezeichnet wurden. Da dies interessante Factum bisher nicht richtig gewürdigt und wiedergegeben ist, so sei es mir vergönnt, die betreffende Stelle hier anzuführen. Es heisst in dem angeführten Manuscript nach Brugsch :—

"Dies ist der Anfang der Summe aller Heilmethoden bösartiger Lepra. Es wurde in einer Handschrift sehr alten Ursprungs in einem Handschriften-Kasten unter den Füssen des göttlichen Anubis in der Stadt Soktem entdeckt, aus der Zeit, in welcher der gestorbene Sapti König war."

Dieser König Sapti war aber nach der Tafel von Abydus der 4te Nachfolger Menas—des ersten überhaupt bekannten Königs von Egypten, und lebte nach Brugsch um das Jahr *4260 vor Christus*. Die Spuren der Lepra in Egypten führen somit bis auf die allerersten Anfänge geschichtlicher Aufzeichnungen und den Beginn der Civilisation des Menschengeschlechtes zurück, als es kaum aus dem Dunkel prähistorischer Epochen heraustritt!

Es ist hier nicht der Ort, weiter auf die Geschichte der Lepra in Egypten einzugehen. Ich möchte nur erwähnen, dass die oft citirten Stellen aus den Büchern Moses u. a. des Alten Testaments, die vom Aussatz handeln, zu wenig präcis sind und mehrere verschiedene Krankheiten begreifen mögen, so dass sie nur mit Vorsicht für die Lepra zu verwenden sind. Ja Professor Münch, der sich eingehend mit dieser Frage beschäftigte, ist überzeugt, wie er anderweitig auseinandersetzt und mir mitzutheilen die Güte hatte, dass unter

dem betreffenden Wort Sâraat der Bibel Lepra überhaupt nic
verstehen sei.

Im classischen Alterthum verbreitete sich wie bekannt die
vom Orient nach Griechenland, und dann nach Italien, von wo si
anscheinend, wenn auch sehr allmählich, schon über das m
Europa ausdehnte; wenigstens existirten, wie Virchow nachwies,
im 7. Jahrhundert Leproserien in der Schweiz, Metz, Verdun, Maës
etc. Die Verbreitung nahm aber erst später, als durch die Kreu
ein intimerer und regerer Verkehr des Abendlandes mit dem Orie
Stande kam, erschreckende Dimensionen an, welche dann zu den
grausamen Maasregeln zur Unterdrückung der Seuche und
Bildung von circa 19,000 Leproserien in der christlichen
führten.

Wenn nun auch in Indien (und vielleicht auch in China ?) a
Ursprungsheerde der Lepra existirten (in Persien wurden scho
6. Jahrhundert v. Christ. Absperrungsmassregeln gegen sie erlasse
so steht wohl fest, dass Egypten für die Durchseuchung Europas al
Wiege diesser Krankheit zu betrachten ist. Während aber das Al
land sich nach Jahrhunderten unsäglichen Leidens und Kampfes
dieser entsetzlichen Plage befreite, blieb sie an den Grenzen Eur
speciell im Norden, Süden und Südosten stationär—und, wie wir s
werden, ist sie in ihrem ursprünglichen Heerde, Egypten, wo sie
vielleicht nie in verheerender Weise um sich griff,—bis heute keines
erloschen. Wenn nun auch eine grosse Zahl von Aufzeichnungen
Mittheilungen über die Lepra in Egypten aus älteren und neu
Zeiten vorliegt, so ist doch, so viel mir bekannt, von Seiten
Regierungen früher nichts gegen diese Krankheit geschehen
selbst unter Mehemet Ali dem Grossen, dem die hygienische Ve
serung des Landes so sehr am Herzen lag und der für dieselbe so
that, fand keine Zeit, sich mit dieser Krankheit zu befassen.
hatte gegen bösartigere Feinde, vor Allem die Pest und die Poc
zu kämpfen, zu denen dann auch noch die Cholera kam, welche
Bevölkerung decimirten.

So viel ich sehe, hat zum ersten Mal im Jahre 1882 der dam
Conseil de Santé—nach einer Aufforderung des Ministers des Inne
eine Zählung der Leprösen in Egypten veranstaltet, die jedoch
Angabe des Präsidenten selbst, laut den procès-verbaux des Con
nur als eine Schätzung bezeichnet wurde.

Es wurden damals von Ober- und Unter-Egypten (nähere De
sind nicht vorhanden) im Ganzen 1018 und zwar je 556 und 462 I
gemeldet, von denen 876 Männer, d. h. circa 86 %, und 142—gl
etwa 14 %—Frauen waren. Eine zweite summarische Berechn
ergab im Jahre 1889, als die vorliegende Enquête schon in Vorberei
war, 1,423 Fälle, also schon beträchtlich mehr, trotzdem von einzel
Provinzen nur sehr lückenhafte Nachrichten eingegangen waren.
von der Pest [illegible]

W[illegible] Sanitätsstatistis
A[illegible] Regierung
Geburts- und Todesfälle [illegible] als eine Hauptauf

erschien, uns soviel wie möglich genau über das Auftreten und Vorhanden sein von Infectionskrankheiten in Egypten zu informiren, schien es alsbald im vitalsten Interesse des Landes, sowohl gegen seine eigenen Bewohner, wie in Anbetracht des sich jährlich steigenden Stromes von Fremden, welche Egypten im Winter seines sonnigen Klimas halber aufsuchen, geboten, eine genauere Untersuchung über das Vorkommen der Lepra in Egypten und wo möglich auch über den Character der Krankheit anzustellen, speciell im Hinblick auf die neuerer Zeit immer mehr in den Vordergrund tretende Betonung ihrer Contagiosität.

Die Enquête wurde nun nach meinen Entwürfen in der Weise vorgenommen, dass allen dem Gesundheitsamt unterstellten Stadt- und Landes-Districtärzten Ende 1889 Fragebogen zugestellt wurden, die sie bei ihren Nachforschungen, für welche die gesundheitlich ruhigste Zeit, die ersten 3 Monate des folgenden Jahres (1890) bestimmt wurden, zu benutzen, resp. auszufüllen hatten.

Die Uebersetzung des eingegangenen grossen Materials, für welche extra ein eingeborener Arzt und ein Schreiber engagirt werden mussten, nahm sehr beträchtliche Zeit in Anspruch; es wurden nämlich, um es gleich hier vorweg zu sagen, im Ganzen 2,204 Fälle gemeldet;—die Lichtung und Durcharbeitung desselben, die ich dann allein besorgte, zog sich weiterhin über so viele Monate hin, dass ich erst gerade jetzt dieselben soweit abschliessen konnte, dass ich ein vorläufiges—Résumé darüber zu geben in der Lage bin.

Um möglichste Sicherheit zu gewähren und eine Controlle der notirten Fälle zu gestatten, musste in die betreffenden Fragebogen jeder Kranke mit Datum, Ort, Name, Geschlecht und Beschäftigung eingetragen werden. Da es fraglich erscheinen konnte, ob die Krankheit immer richtig erkannt war, und es auch ausserdem, wie angegeben, sehr wünschenswerth schien, uns über die Natur der Krankheit zu orientiren, mussten ausser den Personalien noch Notizen über den Status der Krankheit—die Dauer und Anfangssymptome—sodann über etwaige Ansteckung oder Vererbung oder anderweitige angegebene ätiologische Momente, schliesslich allgemeine Bemerkungen über etwaige frühere Behandlung etc. gemacht werden.

Was nun die Richtigkeit der Diagnose, die zunächst als das Wichtigste erscheint, anlangt, so muss ich constatiren, dass ich nach Durchsicht der angegebenen Symptome im Allgemeinen den Eindruck gewonnen habe, dass die Krankheit in den gemeldeten Fällen —mit verschwindend kleinen Ausnahmen vielleicht—richtig erkannt ist. Bei den ausserordentlich characteristischen Symptomen älterer Fälle scheint es ja auch an sich schwer möglich, sich zu irren. Irrthümer sind immerhin aber möglich, denn zweifelsohne kann die Diagnose in einzelnen Fällen Schwierigkeiten bieten, wie auch Leloir hervorhebt, besonders wo es sich etwa nach Ansicht des betreffenden Arztes um Anfangsstadien der Krankheit handelt, und hier sind mir in der That bereits 2 Fälle diagnostischer Irrthümer und zwar in Rosette aufgestossen. Diese Fälle mit kürzerer Krankheitsdauer sind aber in nur verschwindend geringer Zahl vertreten, wie wir später sehen werden.

Andrerseits ist mir dagegen eine Reihe von älteren Fällen bekannt, die nicht registrirt worden sind, so dass die Gesammtzahl, wenn wir die Fälle mit kürzerer Dauer bis vielleicht zu 3 Jahren selbst ausschliessen wollten, mit Wahrscheinlichkeit dennoch nicht niedriger, sondern vielmehr höher angenommen werden dürfte. Es sind inzwischen durch neuere Erhebungen in einzelnen Districten auch in der That noch neue Fälle bekannt geworden.

Es scheint sich dies auch aus der Betrachtung der Betheiligung der Geschlechter zu ergeben. Es wurden nämlich von den 2,204 gemeldeten Fällen 1,773 männliche d. h. circa 80 %, und nur 437 weibliche Kranke, d. h. circa 20 %, notirt. Wenn nun auch im Allgemeinen angenommen wird, dass das männliche Geschlecht stärker von der Lepra befallen wird, so ist das hier angegebene Verhältniss doch ein sehr auffälliges. Auf den Hawaiinseln waren von 3,076 in 20 Jahren (von 1866–86) nach Molokai gesendeten Leprösen 1,972 Männer und 1,104 Frauen, also circa 2/3 Männer und 1/3 Frauen. Die so geringe in Egypten notirte relative Betheiligung des weiblichen Geschlechtes ist aber doch wohl nur scheinbar, und wird seinen Grund in der eigenthümlich zurückgezogenen Stellung der Frau im Orient haben, die auch sonst so vielfach auffällt; was uns veranlasst zu glauben, dass sich ein nicht unbeträchtlicher Theil der Untersuchung entzogen haben möchte.

Der Befund Professor Münch's aus Süd-Russland ist in dieser Beziehung sehr lehrreich. Er fand im Allgemeinen unter 413 Fällen 229 männliche und 174 weibliche—rechnete er aber die Muhammedaner, die Sarten etc. davon ab, nämlich 119 männliche, circa 2/3, und 68 weibliche, circa 1/3, —bei denen er angiebt, dass sich die Frauen oft nicht zur Untersuchung stellen wollten, so ergab sich für die rein russischen Ansiedler 110 männliche und 116 weibliche Kranke—also ein Ueberwiegen des weiblichen Geschlechtes.

Wenn wir uns erinnern, dass bei der Schätzung von 1882 die Frauen in noch kleinerem Procentsatz vertreten waren, so dürfen wir, denke ich, schliessen, dass bei dieser sorgfältiger durchgeführten Erhebung die leprösen Frauen zwar etwas mehr zur Untersuchung heran gezogen, aber doch wohl schwerlich alle aufgefunden wurden.

Auch die aus den Berichten sich ergebende Vertheilung der Lepra* über die Provinzen und Districte und Städte Egyptens ergibt, dass die gefundene Zahl eher zu niedrig sein wird. Zunächst ist schon die ganze "Province de la Frontière" ausgeschlossen, mit Assuan und Wady Halfa etc., welche unter dem Kriegs-Ministerium steht und von welcher uns keine Fälle gemeldet sind; sodann sind aus den Städten, speciell Kairo und Alexandrien, eine ganz geringe Zahl (je 4) angezeigt und ebenso wenig aus den Provinzen Guizeh Beni-Souef, Fayoum, Minieh. Zu ausgedehnteren Nachforschungen hatte ich nun bisher keine Zeit, allein z. Th. aus der eignen Praxis, z. Th. aus gelegentlichen Nachfragen sind mir sowohl aus Alexandrien, wie Kairo, wie auch aus einem Dorf in Guizeh, eine Reihe von Fällen bekannt, die nicht in die Listen mit aufgenommen waren.

* Siehe die beifolgende Liste, page 214 *et seq.*

Die Erhebungen sind natürlich, so lange kein Gesetz über die Anzeigepflicht infectienser Krankheiten existirt, überhaupt sehr schwierig und in den grossen Städten gar nicht durchzuführen, während man auf dem Lande von dem guten Willen der Dorfschulzen und den Kranken selbst abhängig ist. Wenn wir nun aber auch annehmen, dass dieser in den verschiedenen Provinzen wechselt, sowie auch vielleicht, dass die Districtsärzte nicht alle mit derselben Geschicklichkeit und Eifer diese Erhebungen anstellten, so ergibt sich doch aus der Zusammenstellung der eingegangenen Berichte eine so auffallend ungleiche Vertheilung der Leprakranken, dass sie sich aus diesen Gründen nicht erklären lässt.

Während Unter- und Ober-Egypten z. Th. recht zahlreiche Fälle aufweisen, scheint Mittel-Egypten auffallend wenig ergriffen. In Unter-Egypten treten die Provinzen Dakalieh und Garbieh und in ihnen speciell einzelne Districte, dann Menoufieh und Charkieh durch grosse Zahlen hervor, während andrerseits die Behera sehr schwach ergriffen ist. Um eine annähernde Idee von der relativen Vertheilung auf die Einwohnerzahl zu gewinnen, habe ich die gemeldeten Fälle auf die durch den Census von 1882 angegebene Einwohnerzahl nach Districten berechnet. Für die Provinz Garbieh war dies insofern schwierig, als seit dem Census in der Eintheilung der Districte eingreifende Veränderungen stattgefunden haben. Es ist deshalb nicht ausgeschlossen, dass trotz der darauf verwendeten Sorgfalt sich Fehler in meiner Berechnung auf den ohnehin nicht mehr maassgebenden Census von damals eingeschlichen haben. Es können diese Berechnungen deshalb durchaus nur als approximative Werthe gelten.

Die hauptsächlich attaquirten Districte des Deltas sind nach dieser Aufstellung Dekirniss und Farascour in der Dakalieh mit je 1·60 $^0/_{00}$ und 1·34 $^0/_{00}$, sodann Choubrah in der Kalioubieh mit 0·80 $^0/_{00}$, Ibrahimieh in der Charkieh mit 6·76 $^0/_{00}$, Mansourah mit 0.61 $^0/_{00}$ in der Dakalieh, Mehall et Menouf, Santa, Mandoura, Bassioun in der Garbieh mit je 0·75 $^0/_{00}$, 0·66 $^0/_{00}$, 0·57 $^0/_{00}$ und 0·54 $^0/_{00}$. Die übrigen Districte Unter-Egyptens ergeben unter 0·5 $^0/_{00}$. Um diese Vertheilung, soweit ich sie feststellen konnte, zu veranschaulichen, habe ich sie in einer Karte Unter-Egyptens in meinem Bureau graphisch eintragen lassen; von Ober-Egypten war es mir bisher leider nicht möglich eine Districtskarte zu erhalten, da eine solche bisher nicht fertig gestellt ist.

Ein Blick nun auf die Karte* lehrt, dass, mit einigen Ausnahmen, die am schwersten heimgesuchten Districte im Nordosten am See Menzaleh und Mittel-Meer liegen, dass die mittleren Landestheile ziemlich gleichmässig in mittlerer Stärke ergriffen erscheinen, während die im Nordwesten liegende Provinz Behera am wenigsten betheiligt ist. Von den Gouvernoraten Kairo, Alexandrien etc. weisen nur Damiette und Rosette beträchtliche Zahlen auf. Die Provinzen Mittel-Egytens Guizeh, Beni-Souef, Fayoum und Minieh zeichnen sich dann bis auf den District Minieh durch verschwindend kleine Zahlen aus, während diese für Assiout, Keneh, Guergueh wieder beträchtlich steigen—und in den Districten Manfalout, Mellawi, Abou Tig der Provinz Assiout je 1·1 $^0/_{00}$, 1·0 $^0/_{00}$ und 0·85 $^0/_{00}$ ergeben.

* Diselbe wurde für diesen Bericht nicht abgedrucht.

Regierungsarzt kaum Gelegenheit, sich auf seinem Studiengange mit dieser Krankheit vertraut zu machen, und hat ausserdem so manche Obliegenheiten, dass er so zeitraubende Untersuchungen natürlich um so eher zu kürzen sucht, je mehr derartige Kranke zu untersuchen waren. In der That sind die Angaben denn auch sehr häufig zu wenig präcise und eingehend, um sie hier verwerthen zu können. Es wird z. B. häufig nur Lepra mutilans angegeben, unter kurzer Bezeichnung der Verstümmelungen, so dass nicht ersichtlich ist, aus welcher Form diese Mutilationen hervorgingen, andrerseits wird nicht selten " gemischte Lepra " notirt, wo anscheinend die tuberculöse (resp. anästhetische) Form mit Flecken einherging.

Im Ganzen scheint sich aus den Notizen zu ergeben, dass die gemischte, tuberculös anästhetische—respective nach Leloir—trophoneurotische Form, wohl am häufigsten vertreten ist. Es kommt aber auch eine grosse Zahl rein tuberculöser und rein anästhetisch trophoneurotischer Formen vor. Ich habe 848 Fälle die am eingehendsten referirt waren, herausgegriffen und zwar fast genau die Hälfte in Unter-Egypten,—die Provinz Garbieh mit 420 Fällen, und andrerseits Keneh und Girgueh in Ober-Egypten mit 428 Fällen, um sie auf diese Frage hin zu prüfen. Es ergaben sich davon 332 Fälle als gemischte, 223 als anästhetische und 34 als Lepra mutilans bezeichnet, die vielleicht zu letzterer zu rechnen sind;—ausserdem 95 fraglich gemischte;—147 sind als rein tuberculöse geschildert und 17 schliesslich als maculöse. Dabei wiegt unter ihnen in Ober-Egypten die gemischte Form bedeutend vor; sie bildet ungefähr die Hälfte (229) der sämmtlichen 428 Fälle, zu denen vielleicht noch 49 als fraglich gemischt zu rechnen wären; während die rein tuberculöse und anästhetische Form nur je 67 resp. 70 Mal vorkommt. In der Garbieh dagegen überwiegt die anästhetische Form, wenngleich auch die gemischte zahlreich vertreten ist; es sind 153 anästhetische mit 30 fraglichen und 103 gemischte mit 46 fraglichen Fällen notirt, während auf die tuberculöse nur 80 kommen. Es muss weiteren Untersuchungen überlassen bleiben, aufzuklären, ob diese Verschiedenheit durchweg auftritt; immerhin muss ich sagen, dass es nach meinen persönlichen, allerdings noch nicht zahlreichen Erfahrungen, in der That den Anschein hat, als ob in einzelnen Dörfern und vielleicht ganzen Strecken die eine oder andere Form vorwiegt.

Was die maculöse Form anlangt, so wird von den Autoren ja eine solche nicht mehr angenommen — Leloir tritt speciell dagegen auf— und dieselbe nur als Anfangsform oder Theilerscheinung der beiden anderen Formen betrachtet. Da aber in einigen der citirten Fälle eine Dauer der Krankheit von 10 Jahren und mehr notirt wurde, so bleibt nachzuforschen, ob hier nur ungenügende Angaben vorliegen, oder ob doch vielleicht reine Fleckenlepra vorliegt, Morphaea nigra etc. der älteren Autoren.

Verstümmelungen sind sehr zahlreich, von 2,149 Fällen sind solche in 893 notirt, also in über 41%, wobei Zerstörungen des Septum narium nicht mitgezählt sind, sondern nur event Zerstörungen der Nasenflügel.

Am häufigsten traten die Verstümmelungen an den Händen und Füssen zugleich auf und zwar 430 Mal, dazu kommen noch 15 Fälle, in welchen auch Zerstörungen der Nase vorlagen; die Hände allein finden sich häufiger verstümmelt, als die Füsse—je 260 und 129 Fälle, wozu noch 11 resp. 7 mit Nasenzerstörungen kommen. Zerstörungen der äusseren Nase allein finden sich 41 Mal notirt; während die des Septum narium ausserordentlich zahlreich sind. Ich gehe hier nicht näher auf ziffernmässige Details ein, und will nur anführen, dass der Abfall ganzer Finger und Zehen nicht selten, in einem und dem andern Fall der der ganzen Hand, ja ein Mál selbst eines Theiles des Vorderarmes angegeben ist. Die Fälle mit Verstümmelungen der Hände und Füsse trophoneurotischer Form scheinen insofern günstig, als nach dem Abfall des erkrankten Theiles nicht selten ein Stillstand eintritt, und wie schon Pruner, der diese Art als "lepra articulorum" bezeichnete, bemerkte, die Kranken sich danach wieder im Uebrigen ziemlich wohl befänden, abgesehen von etwaigen Verkrümmungen, Atrophien und Lähmungen an den Extremitäten.

Verkrümmungen und Difformitäten sind natürlich gleichfalls ausserordentlich zahlreich notirt, ebenso Eiterungen, und Geschwüre, letztere besonders in der Nase und Rachen. Das Gesicht ist ja bekanntlich eine der Hauptprädilectionstellen, besonders der tuberculösen Form, und findet sich Leontiasis demgemäss sehr zahlreich. Verlust der Augen ist aber relativ recht selten notirt, und dürfte es dann in dem Lande der Augenkrankheiten κατ' ἐξοχήν schwer zu entscheiden sein, ob derselbe auf leproše Affectionen zurückzuführen ist. Häufig ist ein foetor ex nasu et ore angegeben und relativ nicht so selten Verlust des Geruches. Ueberaus häufig ist der Ausfall der Augenbrauen und Lidhaare, sodann der Barthaare citirt. Ob der einige wenige Male angeführte Verlust des Haupthaares auf Lepra zu beziehen ist, dürfte nach Leloir unwahrscheinlich sein; es wird von Interesse sein, auch diese Fälle näher zu prüfen.

Was weiter die Dauer der Erkrankung anlangt, so sind die betreffenden Notizen nur mit Reserve aufzunehmen, da sie nicht auf directen Beobachtungen, sondern auf den Angaben der Kranken beruhen. Für Zeitbestimmungen haben aber die Egypter überhaupt wenig Sinn, und sind ihre Angaben deshalb schon an und für sich unpräcise. Dies dürfte aber wohl mehr weniger für die meisten Leprösen zustimmen, um so mehr, wenn die Krankheit nicht mit scharfen Symptomen, sondern mehr minder schleichend einsetzt. Da nun aber z. B. selbst Fieber auch sonst hier häufig sind, wird dasselbe wohl oft nicht als Anfangssymptom der Lepra aufgefasst werden, und kommt den Kranken hier noch seltener als solches zur Wahrnehmung als vielleicht im Allgemeinen der Fall ist. Von 1,008 Fällen, die ich auf die Anfangssymptome näher prüfte, war mehr oder minder heftiges und anhaltendes oder wiederholtes Fieber nur in 33 Fällen notirt. Was etwaige nervöse Störungen anlangt, zum Beginn der Erkrankung, so sind solche als Gefühl von Kälte oder Brennen, Hyperästhesie, Prickeln, Ameisenkriechen, Zucken und schliesslich selbst sehr heftige Schmerzen im Ganzen in

463 angegeben. Aber ebenso wie das Fieber geben sie, wegen ihres wechselnden Verhaltens, zeitweiligen Verschwindens und Wiederauftretens, resp. Exacerbationen und langer Andauer, kein präcises Merkmal des Beginnes der Krankheit. So wird der Anfang der Erkrankung sehr häufig auf eine Zeit verlegt, wo schon sehr greifbare Zeichen der Lepra, zahlreiche Flecken, Tuberkeln, Schwellungen, Entzündungen, Anästhesien und Atrophien bemerkt werden. Deshalb wird man im Allgemeinen eine längere Zeitdauer als die angegebene annehmen müssen, wie auch z. B. Münch für seine südrussischen Fälle 3 Jahre für die Incubation hinzurechnet.

Die Lepra ist nun überhaupt ja eine ausgesprochen chronische Krankheit, wenn auch hie und da schnell verlaufende Fälle bekannt geworden sind,—und zeigt in Egypten nach unseren Notizen einen starken prononcirten chronischen Character, wie aus folgenden Zahlen erhellt.

In 2,191 Fällen, die Angaben darüber enthalten, war notirt:

eine Dauer von	0–1	Jahre in	36	Fällen
„ „	1–5	„	524	„
„ „	5–15	„	1,186	„
„ „	15–30	„	340	„
„ „	über 30	„	31	„

Pruner hatte zwar gemeint, dass auch hier die Lepra bisweilen einen acuten Verlauf haben könne; allein aus unserm Material scheint sich ein ganz besonders chronischer Verlauf zu ergeben, was ich in meinen Privatbeobachtungen bestätigt finde, und wenn auch in einigen Fällen die Kranken in kürzerer Zeit in ihrer Gesundheit, Aussehen und freiem Gebrauch ihrer Gliedmassen beeinträchtigt werden, und auch Verstümmelungen schnell eintreten mögen, so glaube ich doch, dass in wenigen Jahren zum Tode verlaufende Fälle, wenn sie hier überhaupt vorkommen, in Egypten zu den allergrössten Seltenheiten gehören. Es scheinen diese Verhältnisse für die Lepra ähnlich in Egypten zu liegen, wie bei der Syphilis, was mit dem Klima zusammenhängen mag.

Während dieser stark chronische Verlauf übereinstimmt mit den allgemeinen, speciell europäischen Erfahrungen, scheint dies auf den Hawaiiinseln anders zu liegen. Leider verfüge ich nur über eine Bericht welcher über die Dauer Angaben enthält; es währte danach zur Zeit der Untersuchung die Krankheit—

von	0–1	Jahre in	15	Fällen
„	1–3	„	94	„
„	3–10	„	39	„
„	10–15	„	23	„

Diese Zahlen weichen doch sehr beträchtlich von den unseren ab, da die Fälle mit einer unter 3jährigen Dauer fast 64% derselben ausmachen. Da diese Angabe aus der Anfangszeit der Absperrung der Leprösen aus dem Jahre 1868 stammt, wo dieselbe noch keineswegs rigorös vorgenommen wurde, so ist man doch wohl berechtigt, anzunehmen, dass die Krankheit die Patienten schon in den wenigen Jahren

so arg mitnahm, dass sie sich den Nachforschungen nicht entziehen konnten, denn gern und freiwillig ging Niemand in dies "offne Grab," wofür Molokai damals gehalten wurde. Wir werden daraus schliessen, dass die Lepra einen viel acuteren Character auf den Hawaiinseln hat, als in Egypten.

Auch die grosse Zahl der auf Molokai Sterbenden spricht dafür. Von 1866–76 starben von 1,570 Kranken 872, und in den 20 Jahren von 1866–86 von 3,076 Kranken 2,263. Die Absperrung war, wie wir schon anführten, bis in die letzte Zeist nicht so rigorös gehandhabt und können wir als jährlichen Bestand in der Zeit vielleicht 700 Kranke annehmen (1868 waren es 126, 1876—698, 1879—802, 1886—653; während ihre Zahl 1890 auf 1,159 stieg!). Wenn nun die 2,263 Verstorbenen auf das Jahr mit 113 Todesfällen im Durchschnitt vertheilt werden, so gibt dies eine Mortalität von über 16% (oder 160‰) im Jahre. Um uns schon jetzt, so gut es ging, über die Sterblichkeit der Leprösen in Egypten zu informiren, veranlasste ich eine weitere Enquête über eventuelle Todesfälle bei circa 1,000 der uns ursprünglich gemeldeten im Monate Juni. Die Ermittlungen konnten aus verschiedenen Gründen nur theilweise durchgeführt werden, und so konnte nur über einen Theil der Gesuchten Nachricht gegeben werden, und zwar liefen über 663 Fälle Berichte ein; es waren von ihnen gestorben 69, am Leben 594; es gäbe dies eine Mortalität für beinahe $1\frac{1}{2}$ Jahr von 10·4%—für das Jahr von circa 7–8% = 70–80‰; also beiläufig die Hälfte derjenigen auf den Hawaiinseln!

Wir nähern uns damit dem wichtigsten Capitel: der Bedeutung, welche die Lepra in staatshygienischer Beziehung hat.

Bei der Vertheilung der Leprösen über Egypten habe ich schon hervorgehoben, dass es in den Städten, speciell in Alexandrien und Kairo, entschieden mehr Fälle gäbe, als aufgeführt sind. Eine bemerkbare Zahl ist nur in Damiette und Rosette angegeben. Trotzdem ist es auffallend, dass in den grossen Städten Lepröse immerhin in relativ sehr geringer Zahl vorhanden sind, und ich glaube sagen zu dürfen—nie öffentlich gesehen werden. Es ist nun aber bekannt, dass die Leprösen in Egypten in keiner Weise abgesperrt werden, sondern völlige Freiheit der Bewegung geniessen; und an und für sich also kein Grund vorhanden ist, warum sie in den grossen Städten nicht relativ ebenso häufig sein solten, wie auf dem Lande. Es ist jedoch eine allgemeine Erfahrung, dass die Leprösen sich nicht etwa nach den grossen Städten hinziehen, sondern daraus verschwinden, was wohl mit dem in den Städten höheren Culturzustand der Bevölkerung zusammenhängt.

Bei der merkwürdigen fatalistischen Ergebung, mit der die Araber ihr Geschick und Krankheiten zumal früher ertrugen—ohne Arzt und Kampf (in die Hospitäler wurden die Leprösen zeitweise nicht aufgenommen)—ist es danach um so weniger wunderbar, dass die Lepra den europäischen Aerzten weniger aufgestossen sein mag und noch so wenig aufstösst, wenn man sie nicht gradezu aufsucht, wie es übrigens in den Eingangs citirten Ländern gleichfalls der Fall gewesen ist. Darauf mag es beruhen, wenn Pruner von den "wenigen Leprakranken in Egypten" spricht. Ich kann wenigstens unbedingt nicht annehmen,

dass sich die Lepra seit Pruner in Egypten irgend wesentlich vermehrt haben sollte. Es geht auch aus früheren Schriftstellern und z. B. aus Larrey's Berichten aus der Zeit der französischen Expedition hervor, dass die Lepra zu Anfang des Jahrhunderts keineswegs selten war, wo auch unter den französischen Soldaten—er citirt selbst einen Officier—die Krankheit vorkam. Dass wir aber jetzt eine so wesentlich höhere Zahl Lepröser als 1882 und noch 1889 erhielten, erklärt sich in sehr natürlicher Weise dadurch, dass die damaligen Ziffern auf Schätzungen beruhen, während dies Mal sorgfältiger vorgegangen wurde, und deshalb mehr Fälle ans Tageslicht gezogen worden sind.

Wie sich nun aus dem Früheren ergibt, befindet sich mit geringen Ausnahmen die Gesammtzahl der Leprösen auf dem Lande. Demgemäss sind auch die Fellachen, die Ackerbauer, diejenige Classe der Bevölkerung, welche das bei weitem grösste Contingent Erkrankter stellen. Von 1,712 Fällen, in denen über den Stand Auskunft gegeben wird (er ist speciell bei Frauen häufig nicht notirt), sind 1,310 lepröse Fellachen, also 76 %, und nur 202, die eine andere Profession haben, wovon auch noch ein Theil der Arbeiter, die "Wasserschöpfer," eigentlich zu ersteren hinzugerechnet werden müssten. Unter den Professionisten sind alle möglichen Stände vertreten; sesshafte und fliegende Händler aller Art, Tischler, Maurer, Barbiere, Bäcker, Schlächter, Bootsleute, Schreiber, Lehrer, Lerrafs (Steuereinnehmer), Cheiks, Prediger; natürlich alle in sehr kleinen Zahlen. Als völlig beschäftigungslos, also der ärmsten Classe angehörig—Bettler mit andern Worten—sind davon 201 Kranke notirt; zu ihnen wird noch ein Theil, der ohne Angaben ist, hinzugerechnet werden müssen. Schliesslich ist einleuchtend, und geht dies noch aus einer gleich zu erwähnenden anderen Erhebung hervor, dass auch von den Ackerbauarbeitern der grössere Theil unter die Armen zu rechnen ist. Wie wir aber sahen, ist die Lepra nicht auf die Armen beschränkt, vielmehr sucht sie ihre Opfer in den verschiedensten Ständen, und findet sich auch bei auskömmlich und gut situirten Personen. Während nun in Hinsicht auf diesen Punct sich im Allgemeinen keine auffälligen Verschiedenheiten in verschiedenen Districten zeigen, ist doch hervorzuheben, dass die Professionslosen, d.h. Arme und Bettler, in ganz besonderer Zahl aus Dekerniss und Facascour gemeldet wurden.

Bis zur Entdeckung des Bacillus spielte Armuth und schlechte Nahrung, wie bei den andern Infectionskrankheiten, auch in der Aetiologie der Lepra eine grosse Rolle. Aber auch jetzt ist Hutchinson noch seiner Fischtheorie treu geblieben und auf dem Berliner Internationalen Medicinischen Congress urgirte er dieselbe wieder auch für die Hawaiinseln gegen Arning.

Ich muss nun hier anführen, dass es mich bei der bemerkenswerthen Vertheilung der Lepra über Egypten zunächst frappirte, dass die Districte am See Menzaleh und Mittel-Meer, sowie Rosette besonders von der Lepra heimgesucht sind, da ich annahm, dass dort Fischnahrung ganz speciell vorwiege, und bekannt ist, dass dort der "Fesich" bereitet wird—ein Fisch, der auf die allerprimitivste Weise

conservirt wird, indem er in den Sand gelegt und der Sonne ausgesetzt wird und so in einen eigenthümlichen Zustand der Verfaulung geräth (was sich schon von Weitem durch intensiven Gestank bemerkbar macht), und der von dort in grossen Fässern und Körben in den Handel kommt. Speciell im Hinblick darauf veranstalteten wir eine 3te. Enquête über den Wohlstand und die Nahrung der Bewohner der verschiedenen Provinzen. Das Resultat dieser Erhebung war jedoch dies, dass die Fisch- ebenso wenig wie andere Nahrung für die Verbreitung der Lepra angeschuldigt werden kann. Es stellte sich nämlich heraus, dass abgesehen davon, dass auch die Aermsten zu gewissen Zeiten des Jahres überall frische Gemüse und Obst haben—die Nahrung zwar im Allgemeinen als eine ungenügende bezeichnet wurde, speciell frisches Fleisch nur selten gegessen wird, dagegen vielfach getrocknetes, minderwerthiges Brot aus Mais, Gerste etc. und viel conservirte Speisen,—als: Gemüse, resp. Obst, in Salz, Essig etc.—Käse mit Salz und Molken, ebenso Fleisch und ganz besonders Fische; letztere schlecht conservirte Gerichte aber überall einen Hauptbestandtheil der Nahrung bilden, und speciell auf angegebene Art conservirte Fische desgleichen in Unter- wie in Ober-Egypten, in stark leprösen wie in den freien Districten genossen werden.

Es fällt dabei noch besonders auf, dass, während im Allgemeinen über schlechte Nahrung geklagt wurde, für Assiout, Keneh und Guergueh, wo doch die Lepra gleichfalls ziemlich stark vertreten ist, die Situation und Nahrung der Bevölkerung als eine im Ganzen und Grossen zufriedenstellende und genügende angegeben wird.

Die Theorie der verdorbenen Fischnahrung kann ich danach auch für Egypten nicht als Ursache der Lepra annehmen, da wir sonst eine gleichmässige Vertheilung derselben verlangen und erwarten müssten und ihr die auffällige Verschiedenheit der Verbreitung der Krankheit strict entgegensteht.

Von allgemeinen ätiologischen, ausserhalb des Menschen liegenden, Momenten hat ausser der Fischtheorie keine eine irgend nennenswerthe und discutirbare Bedeutung erlangt. Das Absurde der aus Brasilien bisweilen angeschuldigten Schweinfettnahrung ergibt sich zur Genüge daraus, dass die Araber überhaupt kein Schweinefleisch essen. Ich will nur noch kurz erwähnen, dass, ähnlich wie Leloir bemerkte, einige Mal heftiger Schreck als Ursache der Krankheit genannt wird, und ein Mal—im Curiosum—6 Tage langes Hungern, wonach sich der Betreffende dann zum Uebermass gesättigt haben will!

Nach der Entdeckung des Leprabacillus muss derselbe der Ausgangspunct aller ätiologischen Forschungen bleiben, und wenn die Impfversuche bislang z. Th. nicht glückten, z. Th. nicht einwandsfrei waren—auch der Fall Arnings, die Impfung eines Mörders in Hawai, ist wohl nicht absolut beweisend,—so scheint es ja neuerdings Ortmann in Königsberg positiv geglückt zu sein, Kaninchen leprös zu machen, und wir werden hoffen dürfen, dass die vielfachen ätiologischen Fragen, die noch der Lösung harren, sich auch allmählig aufklären werden. Einstweilen werden wir uns aber für die Frage

der Verbreitung der Krankheit noch an den Träger des Bacillus, den Menschen selbst, halten müssen, und hier tritt uns als die wichtigste Frage—Heredität oder Contagium? entgegen, die von den meisten neueren Forschern im Sinn der Contagiosität entschieden ist.

Was ergibt unser Material in Bezug auf diese Frage? Von 2,149 Fällen wurden in 348 Verwandte in ascendenter Linie oder in gleichartiger, als vor dem betreffenden Patienten erkrankt, angegeben, und zwar 25 Mal die Grosseltern (6 Mal Grosseltern schlechtweg, 16 Mal der Grossvater, 3 Mal die Grossmutter). In 106 Fällen war der Vater erkrankt, in 49 die Mutter, in 40 Onkel oder Tanten (dazu 2 fragliche Fälle), in 79 Fällen ein oder mehrere Brüder, in 26 Schwestern (und 1 fraglicher Fall), 19 Mal Cousins (2 fragliche Fälle). Dazu kommen noch 4 nicht näher bestimmte Verwandte. In descendenter Linie waren zuerst 4 Mal der Sohn, 3 Mal die Tochter und 2 Mal Neffen erkrankt; von Verheiratheten 11 Falle, und zwar 8 Mal vorher der Mann, 3 Mal die Frau. Ausserdem wurden noch 2 Mal die Schwiegereltern als vorher erkrankt notirt. Abgesehen von zahlreichen vagen Bemerkungen über Ansteckung durch Freunde, war solche in 91 Fällen mit Bestimmtheit, sei es auf Mitbewohner, Nachbarn, Diener, oder Herr, oder Mitarbeiter zurückgeführt. In vielen Fällen wurden vielfache Berührungen mit Leprösen auf den Märkten angegeben. Es gibt dies für die Fälle in der Descendenz (Onkel und Tanten mitgerechnet) circa 10 %, Vater und Mutter allein circa 7 %; für gleichlienige Verwandte circa 6 %; nachträgliche Erkrankung in der Ascendenz 0·4 %, Mann und Frau 0·5 %, Nachbarn etc. 4 %.

Von den Fällen, die man für Heredität zu sprechen scheinen speciell der Väter und Mütter, 155 Fälle, sind nun aber eine Reihe, selbst wenn wir eine Lepra hereditaria tardissima annehmen (in Anbetracht dessen, dass nur 6 Kinder unter 8 Jahren als krank gemeldet sind), nicht dafür zu verwerthen, denn häufig waren offenbar der *Vater oder die Mutter erst lange nach der Geburt des Kindes erkrankt*, und andrerseits stehen diesen Fällen eine grosse Reihe gegenüber, in denen es ausdrücklich heisst: "Frau und Kinder gesund." Von 236 Fällen, von denen positiv angegeben wird, dass die betreffenden Kranken verheirathet seien und dass sie zugleich Kinder hätten, waren diese nur 13 Mal erkrankt, während 223 Mal ausdrücklich notirt wird, dass sie gesund seien. Wenn nun auch diese Zahlen nicht beweisend sind, insofern das Alter der Kinder nicht angegeben ist und man einwenden könnte, das die Lepra sich bei manchen noch später documentiren könnte, so ist doch die grosse Zahl von Fällen, in welchen "*gesunde Kinder*" angegeben, in den 13 als leprös notirten Kindern doch sehr auffällig und wenig für eine Vererbung sprechend.

Wenn man weiter einerseits doch annehmen sollte, dass bei den schliesslich so entsetzlich ausgeprägten Symptomen diese sich dem Gedächtniss einprägen und deshalb leicht zu eruiren sein sollte, ob die Eltern an der Lepra leiden oder gelitten haben, also jedes Mal

i p. 2596.

angegeben werden dürfte,—ist est andrerseits bei der langen Incubation und dem chronischen Verlauf dieser Krankheit von vornherein wahrscheinlich, dass eine etwaige Ansteckung sich der eigenen Beobachtung völlig entzieht.

Wenn wir aus diesen Gesichtspuncten die citirten Fälle, unter Verwandten erwägen, müssen wir ohne Voreingenommenheit sagen, dass in allen eine Uebertragung der Krankheit in irgend einer Weise bestimmt anzunehmen ist, also in über 21 % aller Fälle, während eine Vererbung doch nur als vielleicht möglich und auch das nur theilweise in einer relativ sehr kleinen Zahl von Fällen hinzustellen ist, während diese nach der obigen Erwägung eher grösser zu erwarten wäre. Während wir also in einer Reihe von Fällen bestimmt keine Vererbung (Uebertragung von Mann und Frau und vice versa, von Kindern auf Eltern etc.) vor uns haben, sondern unbedingt Contagiosität, ist nur Vererbung für einzelne Fälle als eventuell möglich zuzugeben. Wir werden somit zu dem Schluss kommen, dass die Wahrscheinlichkeit der Contagion eine ungleich grössere ist, als die der Vererbung. Dies stimmt mit der Ansicht der meisten neueren Forscher überein. Die Heredität ganz leugnen zu wollen, ist kein Grund vorhanden; es mag hier ähnlich liegen, wie bei der Tuberculose, wo, wenn auch sehr seltene, Fälle von directer Vererbung auf den Fötus nachgewiesen sind, die bei weitem grössere Mehrzahl der Erkrankung jedoch durch spätere Uebertragung der Krankheit erfolgt. Wie, auf welchem Wege etc. die Uebertragung der Lepra vor sich geht, darüber ist hier nicht des Ort, Vermuthungen auszusprechen; nur eins möchte ich hervorheben, dass das Lepragift ein ausserordentlich fixes, d. h. schwer bewegliches und übertragbares zu zein scheint, oder es sind die Existenzbedingungen des Bacillus ausserhalb des Menschen sehr schwierige, resp. muss er vielleicht erst Veränderungen erleiden, um für uns virulent zu werden. Jedenfalls scheint seine Uebertragung eine noch viel weniger leichte als die der Tuberculose. Das Lepragift muss dem Menschen unmittelbar anhaften und über den allernächsten Kreis seiner Person kaum heraus existiren können, während es andrerseits wieder sehr dauerhaft ist und sich sowohl im lebenden Körper nach Impfungen, wie im todten, nach Arning's Untersuchungen, lange erhält. Es muss ein mit ihm verschleppbarer und mit ihm zurückdrängbarer Ansteckungsstoff sein, sonst müssten wir überhaupt und speciell in Egypten eine viel enormere Verbreitung der Lepra erwarten, wo sie,—eine unheilbare Krankeit—einmal seit grauer Vorzeit heimisch ist, und sodann nie durch irgend welche Maassregeln der Absperrung bekämpft wurde, während wir andrerseits sahen, dass sie durch strenge Exclusivmaassregeln aus Central-Europa zurückgedrängt wurde, ein Schauspiel, das wir heute wieder vor unsern Augen in Norwegen erleben—wo es heute statt der 2,900 Leprösen nur noch 800 derartige Kranke gibt!

Als interessant in dieser Beziehung möchte ich hier anführen, obgleich die Erhebung noch nicht abgeschlossen ist, die wir über diesen Punct anstellten, dass bisher nur *11 Beduinen* als leprakrank zur Meldung kamen. Es ist bekannt, dass die Beduinen die Nachkommen

der ursprünglich sich über Egypten ergiessenden Araber sind, und zwar diejenigen, die sich mit den alten Egyptern, den Fellachen, nicht vermischten, sondern sich von ihnen noch heute fast völlig fern halten, und wenn sie auch für Ein- und Verkauf von Waaren und Nahrungsmitteln mit ihnen verkehren, auch z. Th. sich mehr minder fest angesiedelt haben, doch im Uebrigen ein von den Fellachen gänzlich abgesondertes Leben führen. Wir haben also hier den Fall einer freiwilligen Absperrung, bei sonst ganz gleichen klimatischen und andern Verhältnissen voraus; und hier—wage ich bis jetzt nur zu sagen—scheint es, als ob der sich absperrende Theil fast gänzlich von der Krankheit des andern verschont blieb, trotz Jahrhunderte langem Aufenthalt in dem durchseuchten Lande! Auch dies ist ein Punct, in dem sorgfältige Aufklärung von grossem Interesse sein wird.

Von ungleich höheren Bedeutung schien mir aber in anderm Sinne sowohl für Eypten als Europa die Frage, ob Europäer hier von Lepra inficirt werden. Um dieser Frage näher zu treten, erliessen wir an eine Anzahl bekannterer, länger hier ansässiger europäischer Aerzte in Alexandrien, Cairo und einigen anderen wichtigeren Plätzen Egyptens, die Bitte, uns die folgenden Fragen betreffs dieses Punctes zu beantworten: ob sie je die Lepra bei einem Europäer hier constatirt hätten? und speciell woher derselbe eventuell stammte? und ob nach Ansicht des betreffenden Arztes von diesem Fall anzunehmen sei, dass er sich in Egypten inficirt hätte? Die Antworten gingen zwar nicht sehr zahlreich ein, allein das Resultat derselben, was sich mir auch noch durch persönliche Umfragen bestätigte, ist doch ein sehr wichtiges. Es ergab sich nämlich, dass ausser einer Anzahl Griechen nur eine Deutsche und sonst kein anderer lepröser Europäer von den Collegen gesehen wurde. In 2 Fällen wurde zwar angenommen, dass die Ansteckung in Egypten erfolgt sei, allein auch diese beiden Fälle betreffen Griechen, und der einzige Lepröse anderer Nationalität—die Deutsche—kam nicht aus Deutschland, sondern aus Mexico, wo die Lepra herrscht und wo sie sich auch nach Angabe des Arztes inficirt hatte. Was nun die Griechen anlangt, von denen ich selbst einige Fälle im Regierungs- und dem Diaconissen-Hospital in Alexandrien sah (die dort nebenbei z. Th. seit Monaten mit Tuberculin eingespritzt wurden und zwar einer—was die Geschwüre anlangt, mit denen sein Körper bedeckt war, mit sichtlichem Erfolg—er sah wie neu gehäutet aus, ähnlich wie auch ein Araber im Regierungs-Hospital);—was die Griechen anlangt, sage ich, so können wir sie auf keinen Fall als beweiskräftig für eine Infection in Egypten gelten lassen. Denn wie wir schon Eingangs erwähnten, sind die griechischen Inseln voll von Lepra, und wenn nun bei Griechen die Krankheit hier zum Ausbruch kam, d. h. bemerkt wurde, und sie selbst vielleicht eine Infection im Mutterland in Abrede stellen oder diese auch vielleicht nach *ihren Angaben* nicht wahrscheinlich ist—so beweist das noch nicht, dass sie sich die Infection in Egypten geholt haben. Dasselbe gilt natürlich auch für Syrier—von denen einer gemeldet, der vor 18 Jahren hier beobachtet sein soll—denn Syrien ist bekanntlich gleichfalls voll

von Lepra. Positiv beweisend könnte nur ein Fall sein, wo ein Individuum, aus einen *nicht contaminirten* Lande stammend, die Lepra hier acquirirte. Ein solcher Fall ist aber von keinem der Collegen, die so freundlich waren uns zu antworten, zur Kenntniss gebracht, und kann ich nebenbei noch constatiren, dass aus meinen persönlichen Erkundigungen sich ergab, dass so manche Antworten deshalb ausblieben, weil die Collegen eine solche im Verneinungsfall für unnöthig hielten.

Ich glaube also behaupten zu können, dass ein positiver Fall von Erkrankung an Lepra bei einem aus nicht inficirter Gegend stammenden Europäer, von denen nicht wenige schon in mehreren Generationen hier lebten (z. B. Italiener), in der Neuzeit nicht vorgekommen ist. Ich bin nebenbei überzeugt, dass ein solcher Fall hier ein gewisses Aufsehen erregt hätte und auch zu meiner Kenntniss gekommen wäre.

Wenn wir nun auch als Hauptergebniss dieser Erhebung gefunden haben, dass zwar die numerische Zahl der Leprösen in Egypten nicht unbeträchtlich, ihre relative aber gewiss geringer ist, als z. B. auf den benachbarten Inseln Griechenlands und in Syrien; wenn wir sodann sahen, dass die Krankheit hier einen exquisit chronischen Verlauf und Character zeigt; dass die Gefahr der Ansteckung für die Eingebornen keine grosse und eine solche für Europäer eigentlich gar nicht in Egypten—bis jetzt—nachzuweisen ist, so darf man daraus nicht schliessen wollen, dass man nun auch nichts gegen diese Krankheit zu thun brauche. Im Gegentheil, man sollte nach meiner Meinung Alles thun, um die Krankheit mehr und mehr einzudämmen und auszurotten; und dies um so eher, als der Erfolg in sicherer Aussicht steht.

Einmal ist es ein Gebot der Humanität, die unglücklichen Armen, die in den höheren Stadien der Krankheit einen entsetzlichen Anblick des Jammers und Elends darbieten, der jedem civilisirten Menschen ein Grausen verursacht, nicht verkommen zu lassen. Sodann ist es für den Staat immerhin ein Gebot der Selbsthilfe, einer Krankheit entgegen zu treten, welche die Gesundheit des Volkes und die Prosperität des Landes fortwährend bedroht. Man wird mir einwenden, dass ich grade ausführte, dass keine Gefahr vorläge. Eine unmittelbare Gefahr wie etwa bei Pocken oder gar der Cholera liegt allerdings nicht vor. Allein in einzelnen Districten ist doch die Seuche schon jetzt ziemlich stark verbreitet, und kamen z. B. von Farascour und Dekirniss bereits Klagen und Anfragen von Regierungsorganen, wie dem Uebel abzuhelfen sei—sodann ist bei der immer grösseren Erleichterung und Zunahme des Verkehrs keineswegs von der Hand zu weisen, dass sie sich mehr und mehr ausbreite, falls ihr nicht Einhalt gethan wird; und schliesslich kann Niemand dafür stehen, dass nicht vielleicht die Krankheit durch irgend welche Verhältnisse, deren Vorausbeurtheilung sich unserer Kenntniss entzieht, lebhafter aufflackert und heftiger um sich greift? Egypten nimmt ausserdem im Orient eine ganz besondere und eigenthümliche Stellung gegen Europa ein und es hat als civilisirter Staat gegen sich und gegen Europa zweifellos die Pflicht, gegen diese entsetzliche "prähistorische" Krankheit Front zu machen, und man

wird mit Sicherheit erwarten dürfen, dass die Regierung Sr. Hoheit des Khediven—welcher an den wichtigen hygienischen Fragen des Landes stets ein besonderes Interesse nimmt—Alles thun wird, was in ihren Kräften steht, um diesen unheimlichen Feind zu bekämpfen, wie man schon jetzt in einzelnen Provinzen diese Frage in Betracht zu ziehen beginnt.

Es liegen aber hier die Verhältnisse insofern günstig, als es meiner Ansicht nach einer rigorösen Absperrung, die nach dem Character des Volkes wohl auf heftigen Widerspruch stossen und überhaupt nicht durch führbar sein würde, hier nicht bedarf.

Nöthig wäre: einmal die Gründung von Lepra - Hospitälern, vielleicht 1 oder 2 grössere unter tüchtigen Aerzten und kleinere über die Provinzen nach Bedürfniss verstreut—welche die Armen aufnehmen und zugleich eine Stätte der Pflege und Behandlung dieser Unglücklichen sein, sowie dem Studium der Krankheit dienen sollten. Sodann möchte ich vorschlagen, ein Gesetz zu erlassen, wie es 1885 in Norwegen auf Betrieb Hansens geschah, und welches mir ausserordentlich rationell erscheint, nämlich, dass jeder Leprakranke einen eignen Wohnraum, Bett-, Wasch- und Essgeschirr etc. haben muss und er nur in dem Fall gezwungen ist, in ein Leprahospital zu gehen, falls er sich diesen Bedingungen nicht unterwerfen will oder kann;—was natürlich zumeist gänzlich Mittellose sein werden. Hierzu ist aber eine sorgfältige Ueberwachung der Kranken von Seiten der Sanität nöthig.

Wie sich diese Verhältnisse nun auch in Zukunft gestalten mögen, sollten z. B. Staatsmittel zunächst nicht ausreichend für die Gründung der Hospitäler vorhanden sein, so zweifle ich nicht, dass ein Appell an die Menschenliebe der hiesigen eingebornen, wie speciell europäischen begüterten Gesellschaftclassen ein reges Entgegenkommen finden würde, wie sich z. B. auch in Livland neuerdings eine Privat-Gesellschaft "Für die Bekämpfung der Lepra" gebildet hat. Jedenfalls werde ich es für meine Aufgabe erachten, meinerseits die Lepra in Egypten weiter zu verfolgen und zu studiren, wozu ich diese Enquête, über die ich in Vorliegendem, so weit es mir bis jetzt möglich war, sie durchzuarbeiten, und von der so manche Frage noch einer eingehenderen Prüfung harrt, berichtet habe,—als die erste Stufe betrachte. Als nächstes Ziel erscheint es mir dabei, die eingelaufenen Fälle möglichst selbst zu controlliren, sodann werde ich das eingegangene Material an alle betreffenden Districte zurückgehen lassen und vorschlagen, dass davon ein Register angelegt wird, nach welchem die aufgeführten Fälle bis zu ihrem etwaigen Tode weiter controllirt werden, unter Eintragung der wichtigsten Notizen und mit Hinzufügung neuer Fälle.

Damit wäre zugleich ein Stammmaterial geschaffen, welches sofort zur Hand wäre, wenn das oben angedeutete Gesetz angenommen würde, welches seinen segensreichen Einfluss gewiss schon in bald absehbarer Zeit fühlbar machen würde.

—	Sexe.			Age.								Par 1,000 habitants.
	Masc.	Fem.	Total.	de 0 à 5 ans.	de 5 à 15 ans.	de 15 à 30 ans.	de 30 à 50 ans.	de 50 à 80 ans.	de 80 à X.	Inconnus.	Total.	
Dakahlieh.												
*Ville de Mansourah	4	1	5	—	1	3	1	—	—	—	5	0·19
District de Mansourah	47	15	62	—	1	18	32	10	1	—	62	0·61
do. Miniet Sammanond	12	2	14	—	—	1	7	6	—	—	14	0·14
do. Simbellawen	19	2	21	—	—	2	16	3	—	—	21	0·23
do. Dikirnès	85	47	132	—	15	60	53	3	—	1	132	1·60
do. Faraskour	85	39	124	—	15	62	46	1	—	—	124	1·62
do. Mit-Ghamr	33	1	34	—	3	15	14	2	—	—	34	0·23
	281	106	387	—	35	158	168	25	1	1	387	0·66
Charkieh.												
*Ville de Zagazig	3	3	6	—	1	2	2	—	—	1	6	0·30
District de Kanaryat	40	15	55	—	4	22	23	5	—	1	55	0·54
do Miniet-el-Gamh	29	9	38	—	—	17	16	3	—	2	38	0·40
do. Sawaleh	8	—	8	—	—	2	5	1	—	—	8	0·14
do. Arin	9	3	12	—	—	6	4	2	—	—	12	0·31
do. Ibrahimieh	22	13	35	—	2	15	14	2	—	2	35	0·76
do. Bilbeis	15	5	20	—	—	8	8	4	—	—	20	0·21
Ville Bilbeis	—	—	—	—	—	—	—	—	—	—	—	—
	123	45	168	—	6	70	70	17	—	5	168	0·39
Guizeh.												
District de Oussem	2	—	2	—	—	—	2	—	—	—	2	0·02
do. Badrachine	—	—	—	—	—	—	—	—	—	—	—	—
do. Guerzeh	1	1	2	—	—	—	1	1	—	—	2	0·03
Ville Guerzeh	—	—	—	—	—	—	—	—	—	—	—	—
District Otseh	—	—	—	—	—	—	—	—	—	—	—	—
	3	1	4	—	—	—	3	1	—	—	4	0·02

Den mit * bezeichneten Städten sind ihre respect. Districte eingereiht—und deshalb für die Addition nicht zu berücksichtigen.

—	Sexe.			Age.								Par 1,000 habitants.
	Masc.	Fem.	Total.	de 0 à 5 ans.	de 5 à 15 ans.	de 15 à 30 ans.	de 30 à 50 ans.	de 50 à 80 ans.	de 80 à X.	Inconnus.	Total.	
BENI-SOUEF.												
*Ville de Beni-souef	1	1	2	—	—	1	1	—	—	—	2	0·20
District de Beni-souef	5	1	6	—	—	2	4	—	—	—	6	0·07
do. Beba	5	—	5	—	—	3	—	2	—	—	5	0·08
do. El-Zawich	2	—	2	—	1	—	1	—	—	—	2	0·05
	12	1	13	—	1	5	5	2	—	—	13	0·07
FAYOUM.												
*Ville de Fayoum	5	1	6	—	—	1	3	2	—	—	6	0·23
District de Fayoum	5	1	6	—	—	1	3	2	—	—	6	0·22
do. Toubhar	—	—	—	—	—	—	—	—	—	—	—	—
do. Sannourès	—	—	—	—	—	—	—	—	—	—	—	—
	5	1	6	—	—	1	3	2	—	—	6	0·03
MINIEH.												
*Ville de Minieh	1	2	3	—	—	1	2	—	—	—	3	0·19
District de Minieh	21	6	27	—	—	7	15	5	—	—	27	0·28
do. Beni-Mazar	—	—	—	—	—	—	—	—	—	—	—	—
do. El-Fachne	—	—	—	—	—	—	—	—	—	—	—	—
do. Glosna	3	—	3	—	—	—	3	—	—	—	3	0·05
	24	6	30	—	—	7	18	5	—	—	30	0·10
ASSIOUT.												
*Ville d'Assiout	2	—	2	—	—	—	1	—	—	1	2	0·06
District d'Assiout	26	6	32	—	1	13	17	—	—	1	32	0·29
do. Abou-Tig	45	10	55	—	2	22	19	8	—	4	55	0·85
do. El-Badari	13	3	16	—	—	9	6	—	—	1	16	0·26
do. Abnoub	15	1	16	—	—	5	10	1	—	—	16	0·27
do. Deirout	20	2	22	—	—	12	9	—	—	—	22	0·47
*Ville de Mellawi	2	2	4	—	—	1	3	1	—	—	4	0·37
District de Mellawi	26	7	33	—	1	12	18	2	—	—	33	1·00
*Ville de Manfalout	3	—	3	—	—	—	—	—	—	—	3	0·23
District de Manfalout	80	16	96	—	7	50	31	7	—	1	96	1·09
do. El-Hahat	—	—	—	—	—	—	—	—	—	—	—	—
	225	45	270	—	11	123	110	19	—	7	270	0·55

Den mit * bezeichneten Städten sind ihre respect. Districte eingereiht—und deshalb für die Addition nicht zu berücksichtigen.

—	Sexe.			Age.								Par 1,000 habitants.
	Masc.	Fem.	Total.	de 0 à 5 ans.	de 5 à 15 ans.	de 15 à 30 ans.	de 30 à 50 ans.	de 50 à 80 ans.	de 80 à X.	Inconnus.	Total.	
GUERGUEH.												
*Ville de Guergueh	2	—	2	—	—	1	—	—	—	1	2	0·14
District de Guergueh	56	9	65	—	1	17	31	13	—	3	65	0·73
*Ville de Sohag	3	—	3	—	—	2	1	—	—	—	3	0·20
District de Sohag	20	3	23	—	—	8	10	5	—	—	26	0·25
Ville d'Akimime	3	—	3	—	—	1	2	—	—	—	3	0·16
Ville de Tahta	—	—	—	—	—	—	—	—	—	—	—	—
District de Tahta	87	5	92	—	—	9	22	5	—	56	92	0·88
do. Bardis	33	5	38	—	4	8	21	4	—	1	38	0·55
do. Menchah	32	4	36	—	2	14	18	1	—	1	36	0·50
do. Tama	25	3	28	—	—	14	10	4	—	—	28	0·36
	256	29	285	—	7	71	114	32	—	61	285	0·55
KENEH.												
*Ville de Keneh	10	—	10	—	—	3	7	—	—	—	10	0·65
District de Keneh	44	4	48	—	—	19	27	1	—	1	48	0·58
District d'Esneh	5	2	7	—	—	3	2	2	—	—	7	0·14
District de Farchoute	74	5	79	—	1	27	41	9	—	1	79	0·76
do. Dishneh	27	2	29	—	—	5	21	3	—	—	29	0·29
do. Coss	32	3	35	—	—	5	25	3	—	2	35	0·36
do. Edfou	—	—	—	—	—	—	—	—	—	—	—	—
	182	16	198	—	1	59	116	18	—	4	198	0·41
Total général	1,772	432	2,204	—	116	860	942	192	1	93	2,204	0·34

Den mit * bezeichneten Städten sind ihre respect. Districte eingereiht—und deshalb für die Addition nicht zu berücksichtigen.

Tabelle der Leprösen in Egypten nach Geschlecht und Alter.

—	Sexe.			Age.								Par 1,000 habitants.
	Masc.	Fem.	Total.	de 0 à 5 ans.	de 5 à 15 ans.	de 15 à 30 ans.	de 30 à 50 ans.	de 50 à 80 ans.	de 80 à X.	Inconnus.	Total.	
GOUVERNORATS.												
Caire	3	1	4	—	—	3	1	—	—	—	4	0·01
Alexandrie	3	1	4	—	—	2	1	1	—	—	4	0·02
Ismaïlia	1	—	1	—	—	1	—	—	—	—	1	0·24
Port-Saïd	6	—	6	—	—	5	1	—	—	—	6	0·35
Damiette	17	1	18	—	—	12	5	1	—	—	18	0·41
Rosette	15	8	23	—	5	7	7	3	—	1	23	1·19
	45	11	56	—	5	30	15	5	—	1	56	0·08
PROVINCES.												
Galionbieh.												
Ville de Benha	—	—	—	—	—	—	—	—	—	—	—	—
†District de Toukh	—	—	(27)	—	—	—	—	—	—	—	—	(0·3)
do. Galionb	8	1	9	—	—	4	4	1	—	—	9	0·11
do. Choubra	47	19	66	—	3	27	28	6	—	2	66	0·79
	55	20	75	—	3	31	32	7	—	2	75	0·29
Menoufieh.												
Ville de Chibin-el-Kom	—	—	—	—	—	—	—	—	—	—	—	—
*Ville de Menouf	8	—	8	—	—	3	5	—	—	—	8	0·49
District de Menouf	55	10	65	—	1	27	32	5	—	—	65	0·47
do. Milig	43	10	53	—	2	26	22	2	—	1	53	0·37
do. Soubk	41	12	53	—	1	23	24	3	—	2	53	0·32
do. Achmoune	13	2	15	—	2	6	5	1	—	1	15	0·22
do. Tala	49	9	58	—	2	21	29	4	—	2	58	0·47
	201	43	244	—	8	108	112	15	—	6	244	0·38
Béhéra.												
*Ville de Damanhour	7	2	9	—	1	4	4	—	—	—	9	0·39
District de Damanhour	7	2	9	—	1	4	4	—	—	—	9	0·14
do. Neguileh	20	3	23	—	1	2	16	3	—	1	23	0·27
Report	27	5	32	—	2	6	20	3	—	1	32	

Den mit * bezeichneten Städten sind ihre respect. Districte eingereiht—und deshalb für die Addition nicht zu berücksichtigen.

† Nach später eingelaufener Angabe.

Thursday, 13th August 1891.

The Chair was successively occupied by
The PRESIDENT, FRANCIS GALTON, Esq., F.R.S.,
and
Dr. GEORG VON MAYR.

Indian Factory Legislation.

BY

HOLT S. HALLETT, C.E.

In the census of 1881 one-twelfth of the population of India was classed as "workers" in various materials. Of these more than 8,000,000 were distinguished as females, and nearly 13,000,000 as males.

In the British Isles such workers are protected, so far as females and young males are concerned, from the exactions of their employers by our factory and workshop legislation. In India, however, where the patient endurance of the people surpasses imagination, and the sweater is master of the situation, protective legislation is refused to the great bulk of the working classes. Barely 50,000 women and children out of the 10,000,000 or 12,000,000 women and children employed in industrial pursuits have been brought within the scope of the recently enacted India Factory Act.

Under the India Factory Act all workers of both sexes and all ages who are engaged in the following works are excluded from protection:—

1. Factories employing less than 50 hands, with exceptions which may be made by local governments for factories employing not less than 20 hands.
2. Factories working less than four months in the year, which include most of the cotton presses and ginning factories.
3. Factories on indigo, tea, and coffee plantations.
4. Workshops.

I will first deal with workshops and the minor factories which are excluded from the Act. Owing to workshops not having been brought under regulation, children of any age, from babies in arms upwards, may be employed in them for any number of hours in the day or night, and under the most insanitary conditions. After inspecting a few of these works in which wool and wheat cleaning was being carried on by hand, and the dust was nearly suffocating, Mr. Jones,

one of Her Majesty's Inspectors of Factories, whose services were lent to the Government of Bombay in 1883 for five years, described them as follows:—

"1. Room, 87 feet by 15 feet by 13½ feet. Five small openings, 3 feet by 2 feet, blocked with wood, and two doors. One hundred and four women and children employed in this room, 11 children under 12 years of age, and three at the breast. Room extremely dirty.

"2. Room on the opposite side of the road, belonging to the same man. Room 84 feet by 9 feet by 10¼ feet; seven windows and three doors; walls and roof very dirty. Ninety-two women and 16 children under 12 years of age, three at the breast.

"3. Plenty of ventilation, walls and ceilings very dirty, and dreadful smell from adjoining yard; 90 women and 16 children, from two to 12 years of age, employed.

"4. All the windows blocked by bags; room perfectly dark, except at the doorway; place excessively dirty; filthy drain running between building and the next premises. I was obliged to hold my handkerchief to my face while taking down these particulars."

The condition of the minor factories is even worse than that of the workshops, because danger from unguarded machinery and untrained enginemen is added to the general insanitary condition of the premises. These factories, besides many other works, include cotton presses and cotton ginning factories, the majority of which work less than four months in the year.

In cotton presses and ginning factories the air is choked with cotton dust and fluff, and in the presses the work is extremely arduous. Mr. Sharpe, the engineer of the Apollo Press Company, in his evidence before the Bombay Factory Commission of 1875, declared that:—

"The coolies perspire heavily and profusely, drink much water, and get tired with their work, because they are employed continually for 12 hours per day on work ten times as hard as that of mill operatives. Their working hours should not be be more than six. The coolies are allowed no meal hours, and take their meals as they find opportunity. They suffer from the cotton dust."

Mr. Henderson, the engineer to another press, urged that: "The "operatives are not healthy, most of them suffer from asthma. The "hours are too long for such heavy work. The work kills the men. "They should not be allowed to work longer than eight hours. An "enactment is necessary for the protection of the operatives. How can "you expect to make changes without an enactment?"

No enactment was passed for the protection and relief of these operatives, so the merciless employers took further advantage of their helplessness. Before the Bombay Commission of 1884, it transpired that men, women, lads, girls, and children employed in the cotton

presses and ginning factories were occasionally worked continuously for eight and 10 and 12 days and nights at a stretch, with a rest of half an hour in the evening; and, as a rule, from 4 and 5 a.m. to 7, 8, and 9 p.m., without any stoppage during the day. If six or eight hours a day is as long as a man should be employed in these works, it is surely abominable cruelty to allow lads, girls, women, and children to be employed in them day after day for 23½ hours at a stretch.

The case for protecting the hands in minor factories and workshops was so strong that the Bombay Factory Commission of 1884, though largely composed of persons interested in Indian factories, allowed in their Report that every work employing a single member of the protected classes ought to be under regulation. They said:—

"We are strongly of opinion that all factories—no matter what the number of hands employed—in which steam, water, or other mechanical power is used, should be under regulation, and that other places or workshops where manual labour is exercised should be brought under the law if 10 members of the protected classes are employed therein. We may add that we draw the line at 10, owing to the impossibility, without more inspectors being appointed, of enforcing the law in workshops employing less hands."

To work children, young persons, and women beyond certain limits, is to work them beyond the point where work becomes cruel and injurious to the employed. Captain May, one of Her Majesty's Inspectors of Factories, laid a very clear statement on this subject before the Factory and Workshops Acts Commission of 1875. He said:—

"I apprehend that it is the duty and right of a Government to restrict the hours of labour, so far as to prevent cruelty and injury to the labourer; but that it is neither its duty nor its right to restrict them any further. I consider that this cruelty and injury point would be reached, unless in exceptional cases, by the Acts of 1864, 1867, 1870, and 1871, if slightly amended; or, in other words, that an average of five hours of work per day for children, and 10 hours for young persons and women, is neither so cruel nor so injurious as to require further legislative reduction. In the case of boys, I should not lower the age, *i.e.*, 18, for unrestricted labour, because in many instances the stripling of 16 is less able to bear excessive work than the boy of 13 or 14."

Some surgeons, well acquainted with the effects of factory labour, have placed the injury point beyond which young persons between 14 and 18 years of age should not work considerably below 10 hours a day, and have expressed the opinion that standing for five hours a day at a machine is too much for a child between the ages of 10 and 14.

In his statement "On the Physique of Factory Children," forwarded to the Factory Commission of 1875, Mr. Charles Roberts, F.R.C.S., who investigated the subject for the purposes of Dr. Bridges and Mr. Holmes' "Report to the Local Government Board on the

this in face of the fact that the Bombay Factory Commission of 1884 urged that—

"Women and children should not be allowed to work before 6 a.m. or after 6 p.m."

Only one and a half hours are allowed for a woman's meals, and only an aggregate of half an hour for those of children. Owing to the loose limits in which work may be performed, a woman may be working 22½ hours a day on the shift system, or 13½ hours a day in a factory not working on the shift system, instead of the sanctioned 11 hours; and a child may be working 14½ hours, instead of the sanctioned seven hours, without the inspector having any possible check upon, or clue to, their proceedings.

The India Factory Commission of last year stated that:—

"The result of the present law has been that hundreds of chidren between the ages of nine and 12 are now daily employed in India as full-timers, doing 12, 13, and 14 hours' work, to the great detriment of their health."

When the law is broken the operatives dare not tell the truth to the inspector, because they are well aware that if they did the manufacturer would turn them out of his works. This has been clearly proved by Mr. Jones's Report, contained in the Annual Report of Her Majesty's Chief Inspector of Factories and Workshops for 1887, where, in referring to the trial of a manufacturer in India on the charge of employing children for months over-hours, and not allowing them the legal time for meals, and deducting half the amount due to them in wages on various pretexts, he stated that—

"There was no doubt in the minds of the magistrate, my own, and the police, that these children had all been frightened into making this denial of their first statements; but as their master was the only large employer of labour in the district a quarrel with him meant semi-starvation."

The shift system sanctioned for India combines the evils of loose limits with the still greater evil of allowing women and girls, as well as lads, to be employed at night. Night work is injurious and contrary to nature. Night was made for sleep and not for work. For children under the age of 21, working at night was abolished in this country by the Apprentice Act of 1802, and in each succeeding Factory Act it has been prohibited for all up to the age of either 21 or 18. In 1847 it was abolished for women in textile factories, and in 1867 for women employed in non-textile factories and workshops. At the Berlin Labour Conference it was prohibited for women and children, and for all young persons under the age of 18. In India night work is especially harmful. It is well known that more people are seized with, and die from, heat apoplexy in that country at night than in the day. It is rather late in the century for the Government of India to pass a Factory Act sanctioning night work for young persons and women!

The India Factory Act permits protected children of nine years of age to be employed without a certificate of physical fitness for 42 hours a week, notwithstanding the enormous weight of evidence given before the Factory and Workshops Acts Commission in this country against

exacting nature of the labour in English mills, are not demanded in the interest of the Indian operatives, who would, indeed, be prejudicially affected by them, while they would impose a needless and uncalled-for obstacle to the development of the industries of India."

Let us see how this statement stands the test of evidence given by mill managers, factory inspectors, medical men, and operatives before Factory Commissions which sat in India in 1875, 1884, and 1890. If suffering, through cotton dust and defective ventilation, from chest diseases, inflammation of the lungs and air passages, and derangements of the stomach; if sleeping in damp and crowded dens for part of the night, and exposed to the inclemency of the weather in the open air outside the mill for the remainder of the night whilst waiting for the doors to be opened at daybreak; if having to rise at 3 a.m. to cook their meals, or else going to work without breakfast; if toiling from dawn to dusk every day, a period of 14 hours during the hottest season of the year, in factories artificially heated by steam, with one single interval for meals and rest of a bare half hour, from which the rapacious masters generally manage to crib at least 15 minutes; if risking the cripplement of their frame and deadly injury to their constitution through working in a standing position for 14 hours a day in an enervating atmosphere laden with cotton dust, fluff, and disease; if being driven and bullied and beaten by overseers armed with canes; if being denied all time for recreation and domestic happiness; if being grudged their hard-earned wage-pittance, and being paid their earnings, instead of by the week, as in this country, by the month, and frequently a fortnight and even two months in arrears; if being thus forced, an easy prey, into the web of heartless and unscrupulous money lenders, who mulct them in an interest, according to Mr. Factory Inspector Jones, varying from 75 to 225 per cent. per annum; if all of these form "a standard of comfort and content" for operatives surpassing that of less favoured "persons in their own rank of life who are engaged "in pursuits of a different nature," in which must be included minor factories and workshops—nothing further can be required to prove the urgency of applying our British Factory and Workshop Act to our Indian Empire, so that these miserably degraded and joyless toilers in dark, dirty, dusty, overcrowded, and unwholesome dens; these puny, over-tasked natives of India; these children of children who, according to Sir Richard Temple, in his speech on the address in 1888, have only one-fifth the strength of an Englishman, and are naturally capable of doing only one-fifth of the labour; these wretched beings scrambling for work at any price, knowing nothing of the real pleasures of existence, slaving as no slave would work, with unremitting energy, in the hope of earning a little extra money at the dearly bought price of their health; these human beings, our fellow subjects, who are treated worse than beasts of burden, may be raised from their present state of moral and physical degradation, and rescued from the inhuman exactions of their merciless taskmasters who are wringing the very life out of them.

The statement that "machinery is, owing to the comparative absence "of competition, driven in the factories of India at a pace so slow that "it would not be tolerated in England," may have been true 20 years

[i] p. 2596.

Appendix A.

Medical Opinions upon the Hours of Labour in Indian Factories.

1. Dr. Thomas Stephenson Weir, Health Officer to the Bombay Municipality, in the course of his evidence before the Bombay Factory Commission of 1875, said:—

"He had been in Bombay more than four years, and had made himself practically acquainted with the mills. He had visited some of them, both privately and in his capacity of Health Officer, at different hours and on various occasions. No child under the age of 10 years should be employed in the mills, and children between 10 and 14 years of age should not work more than six hours. The hours of work in the mills were too long. Men ought not to work more than 10 hours, exclusive of their meals. The temperature of 98 degrees was too high for operatives to work in for long hours. He would commend 90 degrees as a maximum temperature."

2. Dr. Joseph Anderson, House Surgeon in a Bombay Hospital, said, before the same Commission, that—

"He had been 21 years in the hospital, and was medical officer to two of the mills, one of which had been in his charge for 18 years. There are cases now and then among the mill people of chest diseases, inflammation of the lungs and air passages, and derangement of the stomach, all due to long confinement in the mills. The atmosphere of mills is injurious to all. The temperature is too high and the atmosphere is fluffy. The present hours of work are too long for all classes of operatives. He proposed a working day of 11 hours, out of which one hour should be given for meals and rest. He would allow 66 leave days, including Sundays. He considered a day's rest, after a week's work, a physiological necessity."

3. Dr. Lumsdaine, the Sanitary Commissioner of the Bombay Presidency, who in 1878 was instructed by the Government to carefully inspect the factories and report on their condition, and as to the protection which should be given to the operatives, after inspecting 22 of the cotton mills, urged in his Report that—

"I think impartial opinion will say the hours of labour ought to be reduced. For men, I would suggest 10 hours; for women, and boys from 13 upward, nine hours; and for children, six hours; and in this time I would give one interval of half an hour in the forenoon and another in the afternoon; so the real working time would be nine, eight, and five hours. On purely physical grounds I would close the mills one day in every seven."

4. Report of the Bombay Sanitary Commission of 1884.—This Medical Commission was composed of Surgeon-Majors Lyon, Gray, and Waters. In the course of their Report they stated that—

We think it very desirable that the daily working hours of these mills should, both in the interest of the general health of the operatives and with a view of preventing accidents from working in rooms insufficiently lighted, be defined by law; and that, further, in the interest of the general health of the operatives, it should be compulsory to allow

certain periods of rest in the day, and a certain fixed number of holidays say four, per month. Lastly, we have to state that we are of opinion that the present limit of age for children, seven to 12, is too low. We think the lower limit should be raised, as in England, to 10. The upper limit ought, we think, also to be raised, say to 14. We have also to say that we have visited several of the minor factories, and that from the result of our visit we are of opinion—

"1. That on account of the danger to life from fires, explosions, accidents from unfenced machinery, &c., every such factory employing machinery, other than machinery worked by hand or animal power, should be placed under supervision.

"2. That on account of the danger to health likely to arise from overcrowding, every factory employing more than a certain number of hands should also be similarly placed under supervision."

5. Dr. Hewlett, Deputy Surgeon-General, Sanitary Commissioner for the Bombay Presidency, urged, in his Report for 1884—

"I decidedly recommend that the provisions of the Factory Act should be extended to all the small factories and workshops."

6. Mrs. Pechey Phipson, who for seven years had medically attended Indian women, in her lecture, on October 11, 1890, in Bombay on child-marriage, pointed out how greatly natives of India were behind Europeans in physical development, and with reference to the age of maturity in India, declared that—

"So far from Hindoo girls being precocious in physical development, they are much behind in this respect; that a Hindoo girl of 15 is about equal to an English child of 11 instead of the reverse, and that the statements which had been made to the contrary by Englishmen who had no opportunity of becoming acquainted with Hindoo family life were totally misleading."

Addressing the natives of India who were present she said:—

"You say, 'We marry our girls when they reach puberty,' and you take as an indication of that stage one only, and that the least certain, of the many changes which go to make up maturity. It is the least certain, because the most variable and dependent more upon climate and conditions of life than upon any true physical development. No one would deny that a strong country girl of 13 was more mature physically than a girl of 11 brought up in the close, unwholesome atmosphere of a crowded city; yet you say that the latter has attained to puberty and that the former has not. Without going into the domain of physiology for proof of assertion, let me draw your attention to the very practical proof of its truth which you have in the fact, well known to you all, that girls married at this so-called period of puberty do not, as a rule, bear children till some years later, *i.e.*, till they really approach maturity. . . . Does not your own experience bear out the truth of the three following conclusions?—

"1. That marriage under 13 or 14 leads generally to the permanent ill-health (if not fatal injury) of the girl, and to sterility.

"2. That where childbirth takes place at that early age no fresh effort is put forth, and no subsequent children are born.

"3. That, even if marriage is delayed till 14, where conception takes place immediately sterility follows after; but where the girl is strong and healthy there is a lapse of three or four years before child-bearing begins—a proof that puberty had not been reached until then. Of course there are exceptional cases, but does not the consensus of experience point to these as general truths?

"Another disadvantage of premature marriage is that in those cases where the young wife bears children they are puny and sickly. Thousands of still-born children, hecatombs of dead infants, an ever-increasing number of sickly, disfigured, and deformed people bear witness to the results of this pernicious custom. . . . Tell me, any one of you, has it never occurred to you, when you have looked upon your young wife turned into a decrepit old woman through your doing, that she has a right to revile you as the author of all her affliction? Does it never dawn across your mind, as you look upon the sickly boy whom you tend with so much care as the sole hope of your declining years, that, instead of returning your affection, he would be justified in turning upon you and cursing you as the author of his wretched being? . . . For centuries you have been children of children, and there is no surer way of becoming servants of servants."

In the face of such a scathing exposure, and of the opinion of medical men and of common sense, the Government of India maintains that puny, half-grown girls and boys of 14 years of age in India should be considered men and women and permitted to slave in Indian factories for far longer hours than full-grown and well-developed English men and women can work in similar factories in the British Isles without injury to their frame and constitution!

Appendix B.

The effect of reduced Working Hours in Factories.

It has been proved by actual, frequent, and sustained experiments in the United Kingdom, the Continent, America, and elsewhere, that, for both manual labour and labour at a machine, there exists a reasonable limit of hours of labour, with which the maximum effective power of the worker generally corresponds, and that it is senseless, as well as cruel, to work a person beyond these ascertainable limits.

I will first deal with evidence given before the last Factory and Workshops Commission—that of 1875—held in this country, as to the Birmingham industries, which include nearly every process of manufacture outside the textile fabrics. Mr. Arthur Chamberlain, of the great firm of gas-fitters and brass-founders, in answer to the question, "Is there any trade in Birmingham that works more than 60 hours a week?" replied, "I should think certainly not; I should think that no "manufacturer in his senses would hope to get any advantage from

consequences, and the 56½ hours a week were agreed to in the Act which was passed in 1874 as a compromise between the manufacturers and the operatives. The operatives soon proved that they could do as much in the reduced hours as they formerly had done. In his evidence before the Gold and Silver Commission, Mr. J. C. Fielden, a Lancashire cotton manufacturer, allowed that in less than 12 months after the passing of the Act "there was not the smallest reduction of produce " from that shortening, even with the same machinery."

Turning to the Continent, we find similar proof that a man, whether tied to a machine or not, is limited by his bodily and mental faculties to a certain amount of profitable work in a day, and that it is senseless, as well as cruel, to work him for more than a certain definite number of hours. Only the other day an account of an experiment with reduced hours of labour by a large manufacturer in Belgium appeared in the " Chamber of Commerce Journal." For three months, as a trial period, this manufacturer reduced his hours from 12 to 10½ a day, and found that this reduction of hours had no appreciable effect upon the production of his factory. At hand-combing the workers did the same amount of work in 10½ hours as formerly in 12; and at machine-combing, which is very fatiguing work for lads, there was a slight increase in production. Many textile factories in Germany have recently reduced their running hours considerably, owing to strikes, and, according to Mr. Oscar Hall, in no case has there been a consequent decrease in production. The reduction of the running hours in textile factories in Austria in 1889 from 12 to 11 and 10 a day, both increased the quantity and improved the quality of the output. Even the reduction of the hours from 11 to eight in the glass works near Dusseldorf, in Germany, after a short time, caused not the slightest falling off in the output.

Only last February, in his speech at Chatham, Sir John Gorst pointed to the great waste of labour in employing men "for unreasonable " and exhausting hours of work." He said:—

"A man who works longer than health and strength allow is wasting his labour, because he is expending his energy and toil when that energy and toil cannot render a proper return. It is most remarkable how you find everywhere proofs that long hours of work, so far from increasing production, actually diminish it. I will give you the last two instances I have come across. In the district of Hesse-Nassau, in Germany, 10 years ago, the glass factories used to work 14 hours a day; they now work 10 hours, and the production in those glass factories has positively increased by the reduction of the hours of labour. In the great linen factories of Plauen, in Saxony, the people work piece-work. They used to work 12 hours, but quite recently the hours have been reduced to 10, and the workmen actually earn by their piece-work more than they did before."

the afternoon, if necessary, and get his half-day's wages. There is no rule or way of seeing him constantly at his post during the working hours of the mill. He is a perfectly free agent in that regard. He feels himself at liberty to take his meals between the hours of 7 and 12, to stretch his legs occasionally, to loiter in the compound, or perhaps have his shave and shampoo under little sheds in the mill compound whenever he pleases. The youngsters may be seen having snatches at leapfrog even on the mill premises, and shampooing each other by walking over each other's body, or playing at marbles in the mill compound, a game they invariably indulge in during the recess hour.

The women have more grace allowed them as to their hours of starting work, as already mentioned. Their physical condition obtains for them another grace. During their menstrual periods they are allowed to stay away without giving any notice, and without fear of losing their place. When they have to look after sucklings they have perfect freedom to go to their place and be back at intervals during the day. In fact, the Indian operatives do not work against their custom, or their natural inclinations, or their traditional habits. And it is but natural, for the employers know but too well what a fruitless task it is to go against the traditional ways of the Indian, which have been established by centuries of habit, and which have actually become his characteristics.

3. The Amount of Rest allowed and taken during the Day.

The mill stops work for half-an-hour at mid-day, and that is the recess time when all the operatives stop work simultaneously. But the Indian operative, who will work at his sweet will and pleasure, is to be seen many times during the day outside the mill either smoking his *biddee* or chatting with his friends, and fully 10 per cent. at a time are to be seen enjoying themselves in the mill compound. Moreover, when the mill starts after the mid-day recess, the Indian operative does not hurry in, and nearly 20 or 30 minutes elapse before the working majority are at their machines. Walk through a mill at any time of the day and two out of six operatives told off for sets of machines will not be seen; they take it in turns to be out in the compound. As informed by the operatives themselves, for fully an hour, if not more, they are not actually at work during the day. So that, although he attends the mill for 12 hrs. 6 mins. 10 secs., the Indian operative's actual working hours per day are only 9½ to 10, his cumulative recess of 2 to 2½ hours being made up of the half-hour's grace to start with, plus an hour or more which he considers himself at liberty to spend in the compound, plus half-an-hour's stoppage at midday. The physique of the Indian operatives requires these short stoppages rather than prolonged intervals after long spells of continuous work.

Hardly one per cent. of the Indian operatives take their meals during the recess hours. Each has his own time, and takes it during the working hours, and is not long over it from the nature of his meal. He wants neither forks nor knives, and does not indulge in the heavy breakfasts of his English brethren.

greater or less extent when there is more than the usual expenditure of physical energy in a given time. The feeling of giddiness, with prostration and aching of muscles, which is experienced after a run to catch a train must be familiar to many. The falling down dead of horses after an unusual gallop is another familiar example. A slight daily excess of the usual expenditure of energy would ultimately act like a slow poison, and like other poisons, the poison of exhaustion not only leads to deterioration of physique but points to an early grave. That this is the fact, and, moreover, that it is not so much the number of hours over which a work is spread, as the nature of the work and the actual amount of physical labour involved that tells upon the health of the labourer is proved to demonstration by the declared experience of the dockyard authorities (*vide* F.C.R., p. 172), viz., that the men in the dockyard (who, by the way, possess originally better physique than the mill hands) whose longest hours are from 8 a.m. to 5 p.m., and who get four Sundays and other holidays in each month, wear out in a very few years by *being kept at work as hard as a European would work himself. The natives cannot stand this, and break down and die.*

5. The Number of Actual Holidays in a Year, and the Period of Absence from Work during a Month.

Often enough substitutes will be put in and the mill-hands will take formal holidays on private affairs, personal, religious, or social. Not even 5 per cent. attend the mill all the working days in a month; not one attends as many as 300 days in a year. The number of holidays taken are, therefore, twice as many as are nominally allowed. They should have four days in a month, and a few extra holidays, and probably they may then not want to give themselves so many holidays for private purposes. But the number of Native holidays is greater than that of the Christian, and the Indian operative will actually be getting more holidays in the year than his fellow-worker in England. It has already been pointed out that women stay away each month any period of a week owing to the recurring illness peculiar to their sex, so that, with the 60 odd general holidays, their holidays in the whole year will show a grand total of over 100.

6. Periodic Change of Work and Visits to the Country.

The Indian mill operative, like most of the work-people, belongs to an agricultural class. Most of them have family plots of land which each one must take his turn to till. There is a common family income, and the earnings of the mill-hands go towards bettering their property in the country. Every year, or at least every two years, the mill operative will go to his *mooluk pani* for two to four months. In fact, like the Anglo-Indian, he has furloughs. He keeps a lien on his appointment by putting in a substitute. He is much better off in this regard than an office clerk. From a health point of view, the Indian operatives have this immense advantage over their fellow-workers in England, who are settled to the districts they work in.

countries, and this serves as a natural protection to the Indian operative from the inflammatory affection of the lungs to which the English operatives often fall victims from the sudden and considerable change in the air that they breath on leaving the hot rooms of their mills. The Indian operative can be in and out of his mill all the year round with impunity. The temperature of the reeling room in which the women work is not at all raised.

ii. *Moisture.*—The mill atmosphere in India is free from that degree of moisture which is imparted to the mill air in England from the use of steam all day long. The Indian operative breaths, therefore, a purer atmosphere as regards the degree of moisture, and this is a further natural protection to his lungs.

iii. *Ventilation.*—It will not be disputed that the Indian mills are more lofty and capacious buildings giving more breathing space per individual than the generality of English mills. Means for ventilation exist but are not properly utilised, owing to the habits of the operatives themselves. It is a peculiar habit with the Indian operative that he *will shut* the windows when he can. He will have any amount of heat but no draught, and the latter he dreads so much that he will shut all the windows as a precautionary measure, as he thinks. It is a common experience to find servants preferring to sleep out on the verandah to indoors with windows open. Should indoor sleeping be insisted upon every window and shutter will be most sedulously shut. To prevent the mill-hand frustrating all means of ventilation, the mill owners should adopt the suggestion of the Medical Committee of 1884, that the openings for ventilation should be placed beyond the control of the operatives themselves, and under the sole control of the manager of the mill, or of his immediate assistants.

iv. *Light.*—The Indian operative has again the immense advantage of the Indian sun, and the sun is so essential for the health and life of all creation. Sunlight does away with the harmful effects of artificial light, and all labour work in India is universally done by no fixed hours, but from sunrise to sunset, there being longer days of work in summer than in winter. It is thought prudent not to sacrifice the natural advantages of sunlight, but to conform to the natural conditions of the country, and even to work according to a system of irregular hours according to the seasons of the year, rather than to have a sentimental uniformity of hours all the year round.

9. The Habits and General Condition and Life of the Class of People to which the Mill-hands belong.

As already stated they belong to an agricultural class, and the districts they come from are very liable to suffer from famines. To begin with, they do not possess in their districts any of that very well developed physique or stamina that is peculiar to the hill tribes generally, to the Purdasee and Navganee classes. They come to Bombay to earn wages which will not only maintain themselves, but also their families and their relations in their districts. The mill industry has not only

helped them out of the difficulty, but has provided them with the mean of improving the condition of their districts generally. Only recentl a Government resolution declared that the condition of the districts the come from has been ameliorated by the mill industry of Bombay, th periodic famine difficulty being not experienced as of old. With th general habit in India, even of the Anglo-Indian, the mill-hand rise early—and so does his whole household: men, women, and children— and prepares himself to start for his mill, which is, perhaps, a mile o two from his chawl. The Indian climate makes his walk to the mil pleasant, if anything, and he is all the better for his little fresh ai exercise. Arrived at the mill he changes his clothes, and spends th day as already described. At the approach of sunset he prepares himsel for his homeward journey, changes his clothes, sees to his brass pot in which his meal was brought to him, and looks out for the firs slackening in the speed of the machinery, when he slips the strap on t the loose pulley, and makes for the main gate, after having apparentl worked for a 12 hours day. On reaching home he goes through hi necessary ablutions, and partakes of his evening meal. Then h amuses himself by chatting with his friends and neighbours, or mor often joins in the musical tom-tom party, which does not break u till midnight. On his holidays, the tom-tom party—the drinking party— and the acrobatic feats party is kept up till he has thoroughly tire himself, or, as he thinks, enjoyed himself to his heart's content. Th bulk of the operatives do not work at the mill all their lives, an hence it is that the per-centage of old operatives in the mills is small but the jobbers and muccadums, who enjoy handsome incomes, keep t their posts, and several of them, whose ages vary from 45 to 60, hav seen more than 30 years' service.

10. Their Physical Condition as revealed by Medical Examination and by Hospital Experience.

The Report of the Medical Committee of the Factory Commissio of 1884 most distinctly lays it down that mill operatives do no exhibit any material deterioration in health or condition, and that this fact is arrived at by physical examination, and is also supported by all that could be gathered as to their health, from the amount and nature of work, from appearances, &c. of the operatives.

Without going into detail it might briefly be stated that a great many operatives were examined during different visits, and they did not show signs of a breakdown in health or physique; *the women were found to be particularly healthy and strong* as compared with women labourers outside the mills. This information was further confirmed by personally inquiring into the history of each of the operatives examined; all the old operatives of 50 to 55 years of age, were constantly at their posts; all they suffered from now and again was malarious fever for a few days. It is well known that life is shorter in India by 10 to 15 years, and an Indian operative of 50 may well represent one of 60

and over in England. In the J. J. Hospital, the largest hospital in Bombay, where all classes of labourers, amongst other people, are admitted, I have not, as a physician, had to treat a single mill-hand within a period of three years. Very few, indeed, have to seek hospital relief, and such as do have to do it are surgical cases, and what has been the experience of our Chief Surgeon, Dr. Gray, who, by the way, was also on the Medical Committee of 1884? "The mill-hands are the best "class of patients; they bear operations well; their progress in the hospital "is satisfactory; their wounds heal quickly; and their recovery is "rapid." It is healthy wounds that do well and heal rapidly, and healthy wounds require healthy flesh and healthy blood, and healthy flesh and healthy blood can only belong to a healthy and well nourished body. This one single fact more than any other truly tells the condition of the Indian mill-hand, and ought to soothe and settle at rest the troubled minds and hearts of mistaken humanitarians.

The conditions of factory labour now gone into refer to the operatives of the large spinning mills that work all the year round. Most of the quotations of Mr. Holt Hallett refer to the ginning factories, which are dotted over the cotton-growing districts, and work only for a season in the year. And, although the work is sometimes hard and the hours long, the natural instincts of self-preservation prevail, and the remuneration that a season's work in the ginning factory brings is more acceptable than the semi-starvation which would ensue without it. The operative knows his own feelings, and this is how he expresses himself:—"We earn enough in three or four months to keep us the "rest of the year; when the season is over we return to our villages "and live well till the next season begins."

There is no parallel case of such factories in England, and it is doubtful if the English factory laws would have been applied to such factories without modifications to suit the different circumstances and conditions of work in them.

But here it must be pointed out that Mr. Holt Hallett's quotations are misleading, even in the case of these factories, for the harrowing tales are told without giving the facts, which in a great measure tone down the apparent hardship of the 23 out of 24 hours' work.

Mr. Drewett says:—

"The women are allowed to go in and out of the factory just as they like, and their relations come in and relieve them and enable them to rest, for even three hours at a stretch. The women sit on the back of the gins, and have simply to lift up the cotton and push it forward. I have often seen them do this mechanically, three parts asleep. *There is very little dust in these ginning factories.* I have known many cases where the hands have broken down from overwork. I have frequently heard of their going away sick, but I have never heard of their death. I myself have worked day and night, without sleep, but I have never been ill through doing so. The women have worked 23 out of 24 hours. *Of course in speaking of* 23 *hours I mean that the woman*

the Indian operative, by law, to breathe impure air, for his friends in England wish that he should work with gaslight just to have uniform hours of work all the year round, as in Lancashire. It would mean forcing the Indian mind to think like the English. It would mean forcing the Indian muscle to work like the English, no matter what natural laws with regard to work done by individual muscle may teach. It would mean killing the muscle of the Indian, and with it his whole frame, by a process of slow poisoning from exhaustion. But, if the Indian muscle cannot give the work of the English muscle, more hands will be required to keep up the production, for the industry will have its life and growth in spite of factory laws; and, this will necessitate reduction in the wages of the Indian operative. This will mean reducing the Indian operative to semi-starvation with the protective application of the English factory laws to Indian mills. Thus, the importing of the benign and protective factory laws of England into India would mean killing the Indian operative, either by the slow poisoning of exhaustion, or failing that, by the equal certain process of semi-starvation. Their application to Indian mills is simply ridiculous, absurd, unnatural, and cruelly mischievous. Mistaken kindness from ignorance is often productive of mischievous results, which make the very hearts which are brimful of kindness recoil with horror, and curse the ignorance and the mistaken enthusiasm which called forth their philanthropic palpitations without any warrant. I feel certain that when they have well digested the facts, and have allowed time for the exercise of their judgment, Mr. Holt Hallett and his mistaken humanitarian friends will halt, and change their course altogether. They will, with better knowledge, denounce every attempt at introducing the English factory laws into India. And Mr. Holt Hallett will be the first, now that he is in possession of the true facts, to come forward to exercise that noble privilege of every truth seeker, to acknowledge his mistake and his misconception; and, moved as he is by humanity and philanthropy, to embrace this magnificent opportunity of doing by his reversed action, so to say, incalculable good to the Indian labourer, whose cause he has espoused, but whom, from not knowing fully, he was in the imminent danger of killing by kindness. But the advocacy of Mr. Holt Hallett and his friends and supporters *against* the introduction of English factory laws into India will have quite another far-reaching beneficent influence. It will increase the class of once discontented poverty-stricken ryots now happily changed into contented and loyal artisans, and thus materially advance the stability and the fame of the humane British rule in the Indian Empire of Her Most Gracious Majesty the Queen Empress; and last, but not least, it will establish beyond cavil the soundness and wisdom of the principle embodied in the pregnant remark of Lord Salisbury, that there should be no "unnecessary, hasty, and mischievous interference" on the part of the home government, even at the instance of well-meaning but uninformed philanthropists.

i p. 2596.

DISCUSSION.

Surgeon-General H. Cook, M.D., F.R.C.P., said:—Although the time allowed for speaking is very limited, it will be of advantage if I state by what authority I rise to speak, or what gives me this authority. I have been 30 years in India, some 15 years in the city of Bombay, and during that time many years as Principal of the Medical College and Chief of the Staff of the Government Hospital of Bombay—the Jamsetjee Jijibhoy Hospital,—having 500 beds, and I have for many years taken great interest in the working of the municipality. I had not intended to speak to-day, but should the statements made in Mr. Holt Hallett's paper stand uncorrected they would reflect very seriously on the humanity of the medical profession in Bombay, on that of its chief citizens, and on the Government. I am extremely sorry that so valuable a paper on this important question should have been so greatly disfigured by exaggeration. Dr. Bahadhurji has just stated what are the real conditions of factory labour in Bombay, and has explained the peculiarities which characterise native labour, so that I need not say anything regarding the actual hours of labour; but I would like to support his general statement that although in Europe it may be the "pace which kills," it certainly is not so with the Indian operative; in all occupations he takes his time, with frequent periods of rest, and varies his work with relaxation. His occupation is not one of caste—going down from generation to generation, and thus increasing the evils of the system, and perpetuating by heredity the ill results of possibly irregulated labour. He comes from his up-country village to make money to pay off his debts, and thus, at any rate, to share in the much higher-paid labour of the city, and when he has had enough of it he retires again to his village. The conditions under which he works in the mills as regards temperature and ventilation would undoubtedly be considered inconvenient, to use a mild expression, by the European visitor, but they are congenial to the native who works best under high temperatures as compared with cold and chill, and who above all hates ventilation. Not that I am defending this, but merely stating a fact. I have often passed, whilst driving through Bombay, crowds of operatives thronging out of the mills at dusk, and they certainly have not the exhausted worn-out appearance depicted in Mr. H. Hallett's paper. They by no means look the "driven, bullied, and beaten" slaves he describes, but a throng of able-bodied operatives—laughing, singing, and chatting with rapid if not boisterous action, hastening to their homes in the enjoyment of release from labour, and the picture by no means represents a mass of "wretched beings, scrambling for work at any price, "and knowing nothing of the real pleasures of existence." But, although I do not agree with Mr. Holt Hallett that it would be wise to force the hands of the Government of Bombay, and to insist on the introduction of an Act assimilating labour in the mills there to that of those in England, I certainly do think that the smaller workshops and factories should be brought under surveillance and regulations. It is notorious that the native of India hates ventilation, and will stop if he can every entry of air, be it door or window, and do his utmost to render the air as stuffy as he can make it; and the ventilation, cubic space, and sanitation of those places should be efficiently regulated.

The Hon. N. N. Wadia, C.S.I.E., A.M.I.C.E., said:—It would not be possible, within the short time at my disposal, to fully reply

to the several points raised in Mr. Hallett's paper, a copy of which has just been placed before me. I fully endorse what has fallen from previous speakers, and more particularly I would draw your attention to what has fallen from Dr. Cook, who I am glad to see here, and to know that he still takes an interest in the Presidency in which he was for many years one of its leading physicians, more particularly so in Bombay. No man had better opportunities and better scope of judging the condition and physique of mill operatives, than he had during his long practice, and I think his experience ought to be accepted in preference to the second-hand statements made by Mr. Hallett, which are vague, and, in many instances, unfounded. If the sensational picture drawn up by Mr. Hallett were true, no doubt there would be strong grounds for a change, and I am sure that no Government would be more ready than the Indian Government, and more particularly the able and wise statesmen who have its direction at present—Lord Lansdowne, Lord Harris, and other Governors—to deal with the question adequately. But India is essentially an agricultural country; three per cent. only of the population are employed in manufactures. Legislation in a country whose industries are young, has to be cautiously introduced; and I can assure Mr. Hallett that the subject has had the most careful attention of the various Governments within the last 10 years; and the Act which is to come in force in 1892 is the outcome of a long and careful series of inquiries made by a Commission; and it is upon their recommendation, after mature consideration in supreme Council, that the Act has been moulded as it now stands. England can well afford to leave to the judgment of such persons as now hold the reins of the Indian Government legislation of this kind in India, in preference to the wild and vague statements now laid before us. If Mr. Hallett, as he states, is interested in the welfare of our operatives, is desirous of helping and promoting their welfare, the best thing he can do is to come out to India, stay amongst us, and learn, not from hearsay, but from practical knowledge and experience, what are our wants, and then I feel sure if he is actuated by the motives which he has placed before us, he will come to the conclusion that the lot of the Indian operatives is not so hard as he pictures it; but that, on the other hand, the operatives in the textile industry are far healthier, far better fed, and in better physique than their fellow men employed elsewhere. And no other evidence is necessary than the fact that mill employment is sought and coveted in preference to anything else. I can assure Mr. Hallett that if he does favour us with a visit he will have every opportunity and facility afforded him of arriving at a true conclusion.

Mr. R. Hamilton, as a former resident both in Bombay and in Calcutta, in favour of the representation of Dr. Cook, Dr. Bahadhurji, and others who had spoken from practical experience, would only refer to the experience afforded by legislation in this country. In 1803 a very well drawn Act was passed with many excellent provisions both for the regulation of labour and for education. No objection whatever was raised to its provisions; but the preamble of the next Act in 1833 stated that no action whatever had been taken under the former law. This new Act gave large executive powers to inspectors to make and enforce regulations. In 1844 a further Act was passed withdrawing all these powers and confining the duties of inspectors to inspecting and reporting. Then, for the first time, real work began; by means of much incessant and patient labour, improvements were gradually introduced, and the

employers of labour were led to co-operate with the inspectors and to second their efforts in the most practical manner. If this method holds good in England, much more will it do so in a country where the population is so essentially conservative and averse to changes. He feared the sweeping and indiscriminating charges of Mr. Holt Hallett would do more to obstruct than to advance the objects he had in view.

Dr. Albert Leffingwell referred to his own experience during a visit to Bombay, and his impressions of the character of the working-class population. He visited the mills of Bombay in 1881, and during much observation of poverty-striken factory operatives in various parts of the world, he never saw a more downhearted and apparently overworked class of working men, women, and children. Forty years ago the same argument now used against legislation in India, were again and again presented in Parliament against any curtailment of hours for labour of children in English factories. Then it was argued that no legislation was required for England, that it would ruin English industries, and the same argument is advanced in favour of Indian industries now.

Mr. Holt S. Hallett, in reply, said:—The question is whether the natives employed in Indian mills are to be left to the mercy of the manufacturers or protected efficiently by such legislation as will prevent any cruelty to the operatives. All present must allow that there may be good manufacturers, but there certainly are bad mill-owners who will squeeze all they can out of their mill hands. The report of the last India Factory Commission does not reflect a pleasant picture. It was found to be the rule that little children of 8, 9, 10, and 11 years of age are worked for as many hours as the men, although by the Factory Act of 1881 such children were restricted to nine hours' work a day. As to the intervals granted in the Indian mills, the report of the Commission proves that the single recess in the Bombay mills is only an average of 15 minutes, and that the hands are only allowed out of the mill besides for one or two intervals of a few minutes. As to the hours of work in the Bombay Mill, the Factory Commission of 1884 gives them as varying between 11½ hours in the cold season, and 14 hours in the hot weather. The Commission of last year gives them as 12, 13, and 14 hours. As proof of the accuracy of these statement, I may refer my hearers to a blue book on Indian Factories, published in 1888, giving recent reports of Indian Factory inspectors. In this report there is a table in which the hours of starting and stopping machinery in an Indian mill are shown for each month in the year. It is there shown that in January the engineers start at 5.50 a.m. and stop at 5.50 p.m., and that in June they start at 5 a.m. and stop at 7.15 p.m. No one who has studied the reports of the Bombay Factory Commissions of 1875 and 1884, and of the Commission of last year, and the reports of India factory inspectors, with an unbiased mind, can fail to allow that every statement made in my paper is amply borne out by the evidence.

An Analysis of Mr. Holt Hallett's paper on Factory Legislation in India.

BY

K. N. BAHADHURJI, M.D., Bombay.

On reading Mr. Holt Hallett's paper, one cannot help noticing that no allowance is made for the different conditions of labour in the different factories. There is, therefore, much confusion of ideas, and the real truth is lost in a mass of conflicting assertions and sensational recitals of what are put forward as facts. The questions which suggest themselves to an ordinary truth seeker and which require exact answers are these :—

1. Does Mr. Holt Hallett consider the term "workers" a definite one? Does he really think that 8,000,000 females work in the Indian mills and factories and workshops? Does his summing up of the number of females employed in the cotton spinning mills, towards which his attacks are principally directed, show enormous totals?

2. Has he himself actually seen, or even heard of any "babies in arms" working in any mill or factory in India, or for the matter of that anywhere on the surface of the earth, and that for any number of hours, night and day?

3. If he has, by what physical laws does he account for these prodigies of babies being the offspring of his "puny overtasked Indian "workers who have only one-fifth the stamina of the English labourer, "and who toil in dark and unwholesome dens"?

4. Does he know how much of the physical ailments he describes is due to the insanitary conditions of the "chawls"? Has he been inside any of these chawls? Which is more unhealthy—to sleep in the chawl rooms, or to work in these factories during the day, where one can go out at intervals to breathe fresh air? Does he know what ventilation means to the mind of the Indian operative?

5. Is he aware that improvement in the sanitation of the small factories by legislation is not only welcome to his "bloodthirsty and inhuman" Indian mill and factory owners, but actually courted by them? How did this fact happen to escape his eye when studying the Factory Commission Report of 1884?

6. Mr. Thomas Drewett, who knows what ginning factories are, and who is quoted by Mr. Holt Hallett distinctly says, at page 175 of Factory C. R. of 1884; that there is *very little dust* in the ginning factories. By what process has Mr. Holt Hallett manufactured these words into "*the air is choked with cotton dust and fluff*"? Does he moreover imply that the work in the ginning factories is extremely arduous? Why does he not accept the fact studied by him and quote Mr. Drewett, who knows that the work is of the *lightest nature*?

7. How did he come to know of children being employed in the ginning factories? Is it a mere story he has heard, or believes to have heard?

8. What is this "abominable cruelty of working lads, girls, women, and children, day after day for 23½ *hours at a stretch*"? Does one's common sense and simple knowledge allow one for a moment to believe in the possibility of the existence of such a cruelty, much less to repeat such absurd and impossible stories?

9. Mr. Holt Hallett quotes Mr. Drewett about the 23½ hours of daily work. Mr. Drewett, however, says, "of course in speaking of 23 hours—"(not 23½ hours, as Mr. Holt Hallett quotes)—I mean that the "woman was relieved by her friends or relations, and the longest "interval she may have is of two to three hours." By what process does Mr. Holt Hallett manufacture the believeable and unvarnished fact of working for 23 *hours with some rest intervals of as much as 2 to 3 hours* during which friends and relations come in as relays, into the absurd and revolting story of *working day after day for* 23½ *hours at a stretch?*

10. Mr. Holt Hallett charges the Factory Commission of 1884 with being largely composed of persons interested in Indian factories. Does he do so from actual personal knowledge, or from his own peculiar knowledge and ways of presenting facts?

Is he not aware that of the 11 members of the Commission, eight were of the independent class?

11. Does he really mean to assert that young persons keep standing for five hours a day at a machine? Is it physically possible for young persons 9 or 10 years of age to do so?

12. Is he aware that flat foot is common enough in people who go barefooted? Would he not accept the experience of medical men, who can speak from knowledge of the present mill hands, that knock-knee is by no means very common amongst them?

13. In doffing is there much physical strength or constrained position required?

14. How many months in the year give 14 hours of light, enough for work from dawn to dusk? Can he cite many mills which have worked for 14 hours? Does he know that it is the hottest season of the year in which the Indian operatives are most regular in their attendance and in better health in spite of the longer hours of work? Does he in all seriousness urge that heat is unnatural to the Indian workman because the English workman cannot bear it so well?

15. The 5 a.m. to 8 p.m. hours of work for women obtain chiefly in the ginning factories that work only for short seasons. Why should these be mixed up with the 8 a.m. to 5 p.m. hours of work in the spinning mills?

16. In the age we live in, with so much night travelling and so many other cases of persons on night duty, would it be natural to say that night work is contrary to nature?

17. What source of information could it be that speaks of fatal heat apoplexies amongst the Indians? Is it that the men, women, and children who work in the open fields under the burning rays of the sun are seized with heat apoplexy when they don't sleep at night? Will Mr. Holt Hallett enlighten the medical world on the nature of night heat apoplexies amongst the Indians?

18. Is age the sole factor to be considered from a health point of view? Is not nature of the work a most important element to be considered in reference both to age and hours of work? Are the children who work in the fields all day and earn next to nothing, or those that loaf about in the streets in a semi-starved condition and crowd the reformatory institutes, better off than children who do a little actual work in most cases in company with their parents or other relatives, throughout the day in the mills, and who earn enough to enable them to be better fed, better clad, and better cared-for?

19. No doubt the Indian operative is deft with his fingers. But does that imply that he is laborious with his muscle and his mind?

20. What analogy is there between the English and Scotch artizan, on the one hand, and the Indian on the other? The Scotch does not make the best spinner and weaver, as the English does, simply because he is not so clever and deft; and though the Scotch may not have the deftness of the English artizan, certainly he has his muscle. Has the Indian operative the muscle of the English or the Scotch, though he may have the deftness of the former? Does deftness mean muscular power or physical force or is it something very different?

21. When Mr. Holt Hallett speaks of the Indian operative as ill fed, does he do so from personal knowledge and observation? Did he not learn exactly the contrary from the words of the operatives themselves recorded in the Factory Commission Report, which he is supposed to have studied? Is he similarly informed when he speaks of the Indian operatives being more wretchedly housed than workers outside the mills? Is it any analogy to compare the work of a child with that of an adult? The Indians who "have one-fifth of the stamina of the English," during their pilgrimage do their 20 to 30 miles a day without exhaustion in their natural way of making journeys with frequent short stoppages all day long. They cannot do it like the English who make long journeys with less frequent but longer stoppages; nor would a long rest afterwards enable them to get over their fatigue. And is not this in accordance with the natural physical laws of work and energy?

22. Does Mr. Holt Hallett want us to believe that he can study the conditions of labour in India by reading the reports and opinions in his own peculiar way, better than the Government on the spot, whose statements he challenges?

23. Mr. Holt Hallet makes great capital of his own extracts from the Factory Commission Report of 1875, and ill-uses the Report of 1884, as shown in questions No. 6 and No. 9.

Does he want to legislate for the India of 1875 or of 1890? Does he think that India has not progressed since 1875?

24. Where did he read of inflammation of lungs and air passages being common in mill operatives? Does he see so much more of it from a distance of thousands of miles than do the medical men on the spot from personal observation? Where did he learn that the mill operatives suffer from stomach derangements more than other classes of labourers in India?

25. Has he seen his "wretched mill operatives exposed to the "inclemency of weather in the open air for the *remainder of the night*, "whilst waiting for the door to be opened at day-break"? If one gets up even at 3 a.m., he takes time to cook his food and walk down to his mill. He cannot be at the mill till after 4.30. Day-break is at 5 o'clock. What does Mr. Holt Hallett mean to convey by picturing the interval between 4.30 and 5 a.m. as the "remainder of the night"?

26. Why does he want the factories to be heated with steam in the hottest season of the year? Whence this unique experience?

27. Not one operative, except the jobbers, works quite 300 days in the year, and does not go to his native country every year or two for a month or longer. With this knowledge in his possession, for he must have studied the reports, by what process of logic and according to what canons of truth did he undertake to assure his hearers that the Indian operative is denied all time for recreation and domestic happiness?

28. Was the knowledge which he must have derived from a study of the reports as to the physical condition of the mill operatives, quite forgotten when he was drawing the harrowing picture of his "puny, overtasked" labourers in the "dark, dirty, dusty, overcrowded, unwholesome dens" of the Indian mills.

29. He may be acquainted with the history and results of factory legislation in England. Does he seriously want people to believe that he is equally acquainted with the history and results of factory legislation in India?

30. Does not Mr. Holt Hallett know that the industry itself, if at all affected by factory legislation, will be affected for the better; but it is the operatives who will suffer from any indiscriminate application of English factory laws to all conditions of factory labour in India.

31. Is it not due to "ignorance of facts, and to the consequent continued belief in the long since exploded pleas" of uninformed humanitarians, that facts happen to be distorted, and even accusations recklessly made against the Indian Government of having their "Councils dominated by capitalist interests?"

32. When Mr. Holt Hallett quotes the opinion of medical men, why does he omit to quote the very first paragraph in the report, which distinctly lays down that the Medical Committee did not find any deterioration of physique or health of the mill operatives as compared with that of labourers outside the mill?

33. Is it because it is diametrically opposed to his picture of the "puny, overtasked, &c., &c.," operatives?

34. The medical opinion is quoted apparently to have the hours of work in the Indian mills shortened. But, indeed, does *defining* the hours (so that people's life and limb may be safe by not working in the dark, as distinguished from dusk) mean *shortening* them? Does defining mean shortening in any case? (I may add that I am acquainted with the Medical Committee personally, and know their views on the subject to be distinctly against shortening the hours.)

35. Mr. Holt Hallett must be aware that Dr. Mrs. Pechey-Phipson, whom he quotes with satisfaction to support his views, repudiated *in toto* the conclusions Mr. Holt Hallett sought to draw from her writings and public utterances? Was it fair to have kept his audience in complete ignorance of this important fact?

Does he mean to assert seriously that he knows better than Dr. Mrs. Pechey-Phipson what she means by her own writings and public utterances?

Le Travail à Domicile en Russie.

PAR

Madame ALEXANDRA TKATCHEF, Docteur en Médicine, Paris.

Il y a deux ans j'ai eu l'honneur désposer au Congrès international d'Hygiène de Paris la situation hygiénique des ouvriers des usines et des fabriques en Russie. Je me propose aujourd'hui de vous entretenir d'une autre catégorie d'ouvriers russes tout aussi digne d'intérêt que la première des ouvriers à domicile, ouvriers-patrons, ouvriers en chambre, cannuts, etc., connus en Russie sous le nom général de *koustari*. Ce groupe d'ouvriers est bien plus nombreux que celui des ouvriers des fabriques; il se chiffre par 7½ millions d'individus, tandis que l'industrie de fabriques n'en comporte que 932,000. C'est dire assez l'importance de ce genre de travail. La production annuelle totale des *koustari* s'élève à une valeur de 1½ millard de roubles. Leur production l'emporte sur la grande exploitation même dans les industries qui nécessitent pour l'emploi des machines. Dans la province de Moscou, par exemple, alors que la grande industrie possède 199 fabriques avec 11,987 métiers à tisser les *koustari*, occupent 45,985 métiers et produisent 80 pour cent. du total des tissus, qui se font dans la province.

L'importance de l'industrie des *koustari* est telle pour la Russie que le gouvernement a nommé en 1872 (Ministère des Finances, Direction du Commerce) une commission chargée de faire des études sur cette question. Cette commission a publié depuis 16 gros volumes, et c'est à eux que j'emprunte les éléments de ce travail.

Le trait spécial qui caractérise les *koustari* en Russie c'est que pour la plupart ils restent agriculteurs, et ce n'est que pour augmenter un revenu trop insuffisant que le paysan, tout en cultivant son domaine, cherche un complement de salaire dans les travaux de la petite industrie.

dix ans. Ils expriment le pour cent. de la dette des paysans contractée chaque année vis à-vis de l'état et du Zemstro (municipalité) par rapport à la somme qui devrait être payée dans le cours de la dite année :—

En	1876	la dette était égale à	-	-	34	pour ciento.
„	1877	„	„	- -	36	„
„	1878	„	„	- -	49·6	„
„	1879	„	„	- -	54·3	„
„	1880	„	„	- -	52·8	„
„	1881	„	„	- -	65·8	„
„	1882	„	„	- -	95·9	„
„	1883	une partie de la dette est remise. Elle s'abaisse par conséquent à	-	- -	26·8	„
En	1884	la dette était égale à	-	-	54·4	„
„	1885	„	„	- -	67·9	„

De telle sorte qu'en 1888 elle s'est élévée pour cette province à *5,623,718 roubles.* ("Annuaire de la Statistique de la province de Moscou, 1888.")

Les industries dont s'occupent les *koustari* sont nombreuses. Il est impossible de les énumérer toutes; voici les principales: filature et tissage des étoffes de lin, de laine, de coton, tricotage, des bas, dentelles, cordonnerie, ébénisterie et les divers travaux qui emploient le bois ou le fer, charronnerie, ferronnerie, serrurerie. Le gain est des plus minimes et s'abaisse toujours. Dans la filature et tissage de lin et de chauvre, il est raison *1 kopeck par heure,* pendant 130 jours de travail d'hiver, l'ouvrier gagne 10 à 12 roubles par an, déduction faite des dépenses d'éclairage et de réparation des outils. Dans la filature de la laine—60 roubles par an pour 14 à 15 heures de travail par jour. Dans le tricotage (femmes) des bas—17 roubles. Dans la dantelle—20 à 30 roubles pour un travail de 19 heures pendant six mois. Dans le département de Kalouga les femmes qui font le calicot gagnent 9 à 10 kopecks par jour.

N'ayant pas de capitaux ni de crédit, le *koustar* est à la merci des revendeurs et des usuriers pour l'achât des matiers premières nécessaires à son travail et pour la vente de ses produits. En Russie aussi est appliqué le *truck system,* et le revendeur rien qu'en fournissant la matière première prélève un énorme bénefice sur le travail des *koustari.* C'est ainsi que les petits fabricants de brosses de Nijni-Novogorod lui payeront leurs fournitures 10 à 90 pour cent. plus cher que la valeur courante sur le marché; les chapeliers perdront 10 à 20 pour cent; et alors que les grands industriels en meubles mettront en produits bruts 35 pour cent. de leur capital circulant, les *koustari* devront y apporter pour une valeur de 51 pour cent. ("Recueil de la statistique du gouvernement de Nijni-Novgorod: Vol. I., pag. 71–72.; Vol. II., pag. 33; Vol. VI., pag. 45 et 144.) Les *koustari* qui font des chaudrons et qui ne peuvent acheter le fer en gros payeront 20 pour cent. au dessus du prix. (*Loc. cit.,* Vol. VIII., 1889.)

Les forgerons et les serruriers de Yeroslawa perdront de leur côté 40 pour cent. sur ce même produit ("Recueil de Statistique," Vol. VI. fasci pag. 144.)

Dans ces mêmes provinces russes pour 100 individus à lâge scolaire, on trouve :—

14·3 du sexe masculin, 2·4 du sexe féminin.

Pour 100 élèves des écoles primaires, il y a 11 élèves dans le cours secondaire.

Pour 100 de ces derniers, on en compte 2·3 seulement dans les cours supérieurs.

En 1887, il y a dans les écoles primaires 2 millions d'élèves des deux sexes.

Quant aux écoles professionnelles, on comptait à cette époque, 19 écoles forestières et agricoles, comprenant 2,000 élèves et 80 industrielles avec 8,000 élèves.

Nous avons vu quels sont les moyens d'existence de *koustari* ; voyons maintenant dans quel milieu il vit et il travaille, comment il se nourrit.

L'habitation du paysan est généralement une chaumière en bois recouverte de chaume. Une petite chambre basse enfumie éclairée par une fenêtre aux vitres de mica ou de papier huilé est le logement de toute la famille. Sa dimension varie entre 7 et 9 archines de côté (5^{m} à 6^{m} 40) pour un ménage de 5 à 6 personnes; avec une hauteur de plafond de 2 archines $\frac{1}{2}$ (1^{m} 77). Il faut deduire près du quart de cet espace qui est généralement occupé par un fourneau en briques. C'est là dessus que l'on couche, ou bien sur des *nari*, sortes de treteaux en planches qui servent de lit commun. Pas de literie ; de vieux caftans, des débris de pélisse en tiennent lieu. Le dessous des nari sert de réceptacle à des détreties sans nous, aux débris du ménage, à des restes de nourriture jetés en pature aux animaux qui vivent en commensaux avec le paysan et y trouvent un abri sous sa couche.

Le plancher est en bois mal joint ou souvent en terre battue. Par les temps de pluie et de neige il s'y forme une couche de boue visqueux mélangée de matières organiques, excellent milieu de culture pour les microbes. Il n'y a pas de ventilation ; les portes et fenêtres sont soigneusement closés, et sous l'influence du poële, il s'exhale une atmosphère humide et méphitique. Dans certain départements, les izba sont dites *kouinœiu*, c'est à dire, fumies. Elles n'ont pas de cheminée.

C'est dans de telles habitations que les *koustari* est logé au milieu de parasites animaux, c'est là qu'ils travaillent 18 heures par jour à des industries qui souvent développent autour de lui des poussières épaisses et nuisibles.

Le vêtement est peu compliqué. Une blouse, un pantalon de cotonnade ou de grasse toile. Par dessus l'hiver une pélisse fourrie. Les pieds sont entourés de chiffons et chaussés de *lapti* ou pantoufles en lanniers d'écorces attachés par des cordons qui se croisent sur la jambe. Tel est le costume des hommes. Ce n'est que pour les grandes fêtes que par exception, on porte des chaussures en cuir. Le femmes vont généralement nu pieds. Leur costume comporte une jupe et une chemise. Il est completé l'hiver par une casaque foarrée.

Quant à la nourriture, elle consiste pour des millions d'individus en Russie, surtout en pain de seigle avec des aignons, des choux, des

35,000 roubles pour l'amélioration de la situation. Le gouvernement de la Finlande a consacré 20,000 roubles à l'amélioration de l'industrie de ses *koustari*.

Certaines municipalités ont fait des expositions d'outils et de modèles, elles ont crée des dépôts pour les produits; elles ont ouvert quelques écoles professionnelles et des banques de crédit.

Mais toutes ces tentatives sont restées infructueuses. Et cependant si l'ordre de chose actuel continue le peuple russe arrivera fatalement à la déchéance physique et à la banqueroute économique complète. Pour que les remèdes que l'on propose aient des résultats heureux, il faut avant tout des reformes politiques, économiques et sociales. Elles sont urgentes; espérons qu'elles viendront assez tôt.

Du Travail dans les Fabriques au point de vue Sanitaire.

PAR

M. Kowalkowsky, Professeur d'Hygiène à l'Université de Varsovie, et par M. B. Swiatlowsky, Inspecteur des fabriques du district industriel de Varsovie.

La population ouvrière de la Russie qui comprend 900,000 ouvriers des fabriques et des usines, 600,000 artisans et 7 millions et demi d'ouvriers en chambre (*koustari*) forme 10 % de la population totale, proportion supérieure à celle que nous donnent d'autres états de l'Europe, Angleterre, France, Allemagne, si nous nous en rapportons aux calculs déjà un peu anciens de Kolb. C'est donc à tort que l'on considère généralement la Russie, comme un pays essentiellement agricole. C'est à peine si le revenu de toutes les propriétés foncières y atteint trois fois le gain net des personnes qui s'occupent de la petite industrie et des métiers industriels qui s'élève à un milliard et demi de roubles.

Le dixneuvième siècle est fier de son industrie. Il ne doit pas rester sourd et aveugle pour les besoins de ceux qui contribuent à son développement.

Au point de vue économique, le travail des femmes et des enfants apporte trop peu à la famille en comparaison des pertes qu'il lui fait subir au point de vue sanitaire et au point de vue moral. Il mène la santé de la femme et empêche la délicate constitution de l'enfant de se développer. Il a une influence désastreuse sur la moralité par la promiscuité des sexes, surtout dans les industries que nécessitent une haute température et où hommes et femmes travaillent ensemble à demi vêtus. Les lois russes ont essayé d'obvier à ce dernier mal en ne donnont l'autorisation du travail de nuit aux femmes et aux adolescents que sous la condition expresse qu'à cette même division travaille le chef de la

3. Les vœux de rapporteurs au Congrès peuvent être formulés dans les propositions suivantes :—

1°. La législature concernant les ouvriers de tous les pays doit être complétée par une série de nouveaux réglements ayant trait aux mesures sanitaires à prendre pour chaque industrie.

2°. Le travail des femmes et des enfants dans les fabriques doit être réglementé par un décret international.

3°. Le travail dans les fabriques doit être interdit aux enfants au dessous de quatorze ans.

4°. Interdiction d'un travail de plus de 6 heures pour 24 heures aux adolescents de 14 à 18 ans.

5°. Interdiction du travail de nuit dans toutes les industries aux femmes, aux enfants et aux adolescents.*

6°. Interdiction du travail pour le Dimanche.

7°. Interdiction des travaux des femmes, des enfants et des adolescents dans toutes les industries insalubres.

8°. Interdiction complète de certain procédés particulièrement dangereux jusqu'à ce que la technique en ait fourni de meilleurs. (Par ex. proscription des allumelles au phosphore blanc.)

9°. Le maximum de la durée du travail pour les femmes ne doit pas dépasser 10 heures par jour. Ce travail doit être coupée par un repos d'au moins une heure et demi.

10°. Obligation pour les femmes enceinte de quitter le travail six semaines avant les couchés et de n'y rentrer que six semaines après, avec maintien de son salaire pendant ce temps.

11°. L'inspection doit être étendue aux métiers et au travail à domicile.

12°. Il faut soumettre à un réglement sévère l'entretien de l'atelier (éclairage, propreté, ventilation, état des planchers, les plafonds, des murs, etc.), et le logement des déchets et des eaux vannes.

13°. Nécessité de l'installation dans les fabriques de refectoire, et de tous les moyens d'entretenir la propriété du corps (lavabo, eau, savon, essuies-mains).

14°. La responsabilité des patrons doit s'étendre non seulement sur les traumatismès du travail, mais aussi sur les maladies contractées en service. Exception doit être faite au cas où le patron démontre l'imprudence du plaignant.

15°. Toute industrie dans laquelle il se dégage des poussières ne devrait être autorisée que dans le cas où tous les moyens nécessaires sont employés pour leur élimination. La même indication doit être applicable aux industrie où il se forme de gaz dangereux et des produit vénéneux.

* La législation russe interdit non seulement le travail de nuit aux enfants, mais depuis 1886 cette interdiction s'étend aux femmes pour toutes les industries qui de temps immémorial ressortent du travail des femmes (filatures et tissanderies). Semblable loi n'existe en aucun autre pays sauf en Angleterre et en partie en France ; mais dans ces derniers, en ravanche, dès 21 ans, la femme peut être employée aux travaux nocturnes.

Les aperçus suivants sur une des conditions essentielles de la méthode statistique ne peuvent pas donner des détails d'une profonde étude, qui s'étend sur tous les détails de la question. Mais bien que je me restreindrai à quelques observations je trouve la question assez importante pour qu'elle soit brèvement constaté avant un aréopague de la plus haute autorité, comme le Congrès démographique. Mon tâche sera d'autant plus facile, que chacun de mes collègues, bien honorés, qui s'occupe des recherches statistiques, aura déjà très souvent remonté les difficultés que je veux signifier et aura très souvent combattu les doutes qui en dérivent.

Éclairés aux moins des difficultés c'est pour le moment, au moins selon mon avis, l'une très grande importance. Premièrement à cause de la circonstance très favorable que la significance des recherches statistiques est de jour à jour croissante. Le terrain de ces recherches s'agrandit et la solution des problèmes les plus importantes pour la société humaine se fait par les données statistiques. Vu cette circonstance, il est de la plus haute portée que l'instrument, dont nous profitons, soit de la plus grande perfection. Encore me faut-il faire mention d'une autre circonstance, et c'est la grande incertitude des résultats statistiques, qui fait, que beaucoup de monde ont de défaire envers les résultats de cette méthode. L'application de la méthode statistique manque souvent de ces garanties scientifiques des études exactes, sans les quelles les résultats ne peuvent pas avoir cette valeur, qui est seulement la qualité des principes vérifiées.

Conformément aux remarques exposées chaque tâche qui tend à rechercher les conditions de la métdode scientifique de la démographie est à approuver et cette en conséquence que j'espère que vous me honorer de votre attention pour quelques instants, qui seront vouées à démontrer que l'étude précise des phénomènes sociales dépend en grande partie de l'exposition correcte et détaillée des phénomènes selon la durée des oscillations de ces phénomènes et les causes qui y influent.

La démographie a un double ressort ; elle constate l'évolution des phénomènes et elle en recherche les causes. Par l'un elle appartient aux sciences descriptives, par l'autre aux sciences pragmatiques. En cherchent les causes des phénomènes la démographie éclaire les questions les plus difficiles et s'associe aux sciences les plus importantes. En se dévouant à l'explication des causes des phénomènes sociales, on doit avant tout faire la distinction du temps. Tous les phénomènes arrivent dans le temps, et avec l'écoulement du temps ils montrent des variations, changeant, modifiant les causes, c'est-à-dire les circonstances connexés ou causales. C'est à cause de cette circonstance et de l'importance de l'étude des variations des phénomènes sociales qu'il gagne de si grande importance de constater les variations journalières, mensuelles, etc. de ces phénomènes. Il faut remarquer en général que de constater correctement et spécialement les phénomènes dans leur cours temporel est pour la statistique un grand devoir. En étudiant les phénomènes de la vie humaine, la statistique doit reconnaître l'importance de cet élément. Tout ce que la statistique étudie, se rapporte à une certaine période. De constater correctement cet élement, ça donne beaucoup de difficulté. Nous savons tous combien de difficulté rencontre la

statistique quand elle cherche à constater justement l'âge des individ nous savons aussi, combien de difficultés elle trouve en constuant tableaux des phénomènes administratives, financières, politiques, à ca de la circonstance facheuse, que l'année administrative, financière va selon les divers pays, même dans le même pays selon des divers branc de l'administration. L'importance de cette circonstance se mon surtout quand nous cherchons la causalité des phénomènes. Si n cherchons, ex. gr., l'influence des prix des céréales sur le nombre naissances, des mariages, des décès, il faut savoir pour quelle péri doit être faire notre recherche ? Est-ce qu'il est possible de consta l'influence pour la même année, qui montre par ex. des hauts prix, seulement pour l'année suivante ou pour quelque autre période ? Il toujours d'une importance capitale de signaler correctement les period car les succès et la valeur scientifique des recherches statistiques dépe de cette circonstance. Sur cette question de la méthologie statisti nous avons déjà aussi des travaux remarquables, dont je rappelle surt un travail d'une date tout récente, du statisticien autrichien Mischler, en a fait l'objet d'une étude dans le "Allgemeine Archiv," de Ge Mayr.

La question du temps *in extenso* serait un thème trôp vaste p être exposé d'une manière exhaustive à cette occasion. Je restraint n remarques à un point : la circonscription des observations selon charactère temporel des variations du phénomène observé. La stat tique rapporte la plupart des phénomènes à une période annuelle. suffit en général pour la connaissance des variations que montrent naissances, les mariages et beaucoup d'autres phénomènes. Mais statistique régistre beaucoup de phénomènes selon leur narration jo nalières ou mensuelles. Pour la recherche de la causalité je v maintenant remarquer, qu'il faut la faire toujours avec la spécialisati que le charactère des oscillations montre. Quand nous étudions causes qui influent sur la vie organique et superorganique, alors n trouvons, qu'il en a deux séries : des causes constantes, invariables, des causes inconstantes, variables. Pour les causes constantes l'étude peut faire pour la période d'une année ou une autre, parce que ces cau ne montrent pas de changement dans le temps. A ces causes appartie p. ex. la hauteur du terrain, et pour cela ce cherchant son influence s la mortalité, il dépand de l'observation de désigner la période d'obser tion. Mais la plupart des causes démographiques est d'un charact variable. La température, les prix, le bien-être et tous les circonstan qui influent sur beaucoup des phénomènes ne varient annuellement, exclusivement mensuellement, mais selon différentes périodes. Qu'est qui en suit quand à la recherche de leur influence sur les phénomè démographiques, économiques, etc. ? Certes, que nous ne réussissions connaître cette influence si nous nous contentons à prendre le mo annuell de la température, etc., car ce moyen est une abstracti effectivement, les phénomènes sociales et démographiques ont éprou chaque jour la variation, qui s'est produit dans la témperature, etc. moyen ne donne pas une bonne directive par le seul circonstance mê que ce moyen—comme nous le savons très bien—peut être le résul des valeurs très différentes, même contraires. Prenons par ex. l'influe

des prix des céréales sur la mortalité. Le prix du foment peut-être également dans une année 22 francs ; alors il y a peu de variations, peu d'altération dans la manière de vivre. Mais le moyen annuel de 22 francs peut aussi être le résultat d'un mouvement des prix entre 28 et 16 francs, que donne aussi le moyen de 22 francs. Personne ne doutera, que ce sont deux cas bien différents, dont les effets sur le mouvement de la population doivent être différents. Le même charactère s'attache à tous les causes variables. Il faut donc les suivre dans leur oscillations, soit-ce la température, les prix ou autre circonstance. Nous voulons, par exemple, étudier l'influence de l'agio sur le commerce extérieur. L'agio peut varier chaque jour et les marchands disposent selon ces variations ; ils achètent ou venrent selon l'état de l'agio et ils font cela un immédiatement sous l'influence de l'agio. Quand nous nous contentons d'examiner les mouvements du commerce extérieur seulement sur la base des récoltes annuels, il est tout-à-fait impossible de reconnaître de si près et clairement les oscillations du commerce extérieur qui accompagnent les variations de l'agio.

Les grands faits de la vie, qui composent le cercle des phénomènes démographiques, dependent en prèmière ligne des lois physiologiques qui sont presque entièrement, hors de nos investigations. La statistique prend pour champ de ces recherches surtout les causes sociales et son intérêt s'attache surtout à l'investigation des moments d'un charactère variable. Mais ces moments sont d'une influence lente, peu marquée, on pourrait presque dire, un peu mystique. L'investigation en masse, et c'est aussi l'effet des recherches sur la base des données annuelles, a l'avantage de coureuser les phénomènes et d'en faciliter l'étude, bien que l'investigation de pas à pas dénoue la masse en des observations presque individuelles, ce qui a pour conséquence, que l'influence des causes ne fait pas ressortir, car il est trop faible pour être reconnu et pour cela il ne peut pas être de découvert. Les causes minimès ont des effets minimès et disparaissent. Mais bien que cela semble s'opposer à votre méthode, nous en tirons une autre leçon. Il est tout-à-fait vrai, que l'investigation marchant toujours près de chaque oscillation, les effets des diverses causes sont plus difficiles à reconnaître, car dans la plupart des cas l'influence sera à peine à apercevoir. Mais il est aussi vrai, qu'en raisemblant des oscillations de charactère différent, le résultat est encore plus problèmatique. Selon la correcte méthode nous réussissons au moins dans ce cas, que les causes régissantes sont d'une importance assez grave, et nous aurons outre cela encore le bénéfice de constater le degré de force qui est nécessaire afin que les forces étudiées gagnent une influence modifiante sur les phénomènes.

Bien que d'autre part je ne veux pas nier, que la méthode exposée a ses limites et ses difficultés. Elle a ses limites où le nombre des faits observés est si petit qu'elle défend l'application de la méthode numérique. La statistique s'occupe en première ligne des collectivités, qui vous donnent l'avantage que Poisson nommait " la loi des grandes nombres." Outre cela la méthode exposée peut avoir pour conséquence qu'en directenant le nombre des données, une masse de diverses causes gagne influence et il sera impossible de constater une des causes séparément. Il faut reconnaître ces difficultés, mais il faudra recouvrer à étudier

profondément et rigoureusement les phénomènes sociologiques, dont
structure est si compliquée si nous voudrions chercher une méthode q
éloigne chaque difficulté. Je suis persuadé que chaque méthode qui n
regarde pas la nature des phénomènes dans toutes leurs singularités, n
peut pas réussir, et pour cela j'avais bien voulu exposer ici la nécessité d
suivre les phénomènes et leurs components dans leurs oscillations.

Ces observations me conduisent à la conclusion suivante:

L'investigation des phénomènes démographiques et surtout l'investi
gation de la casaalité des phénomènes démographiques doit, en ca
possible, prendre pour base, au lieu des moyens, les oscillations actuelle
des phénomènes.

Un excellent écrivain de la race anglaise d'outre mer, M. Ralp
Emerson, dit "Steam is an Englishman." Moi, j'y ajoute, que l'étud
inductive est aussi "an Englishman." Non seulement parce que c'es
le pays native de Francis Bacon, mais aussi par l'occasion de fair
connaissance des grandes problèmes sociales en conséquence de quoi j
suis persuadé que le Congrès de Londres fera avancer ces études qu
ont la plus grande importance pour l'humanité.

Einfluss des Alters der Eltern auf die Vitalität ihrer Kinder.

VON

JOSEF KÖRÖSI, Director des Budapester communalstatistischen Bureaus.

Der Zweck nachfolgender demologischer Studie ist, zu untersuchen
ob das Alter der Eltern von Einfluss auf die Lebenskraft der Kinde
sei, bejahenden Falls, das statistische Mass dieses Einflusses z
finden. Es dienen zu diesem Behufe jene Angaben, welche ich i
Budapest bei jedem Todesfalle eines Kindes bis mit zehn Jahre
über das Alter der Eltern und über die Todesursachen der Kinder sei
vielen Jahren aufzeichnen lasse. Die hier unterbreiteten Ergebniss
gehen aus der Beobachtung der Todesursachen von 29,813 Kinder
hervor.

Im Hinblick auf die Tendenz der anzustellenden Untersuchunge
lassen sich die Todesursachen der Kinder in zwei Gruppen bringen
solche, wo der Keim der Krankheit bereits im Mutterleibe erworben
und solche, wo der Tod durch eine erst im Laufe des Lebens eintretend
Ursache herbeigeführt wurde. Man könnte die Ersteren als *uterine*
die Letzteren als *extrauterine* Todesursachen bezeichnen. Zu de
uterinen habe ich alle Fälle der schwachen Constitution gerechnet
also die an angeborener Lebensschwäche, ferner die an Atrophie un
Inanitio verstorbenen Kinder, desgleichen die lebend zur Welt gekom
menen, aber in kurzer Frist verstorbenen Frühgeburten, die eigentlic
nur eine besondere Art der an Lebensschwäche Verstorbenen repräsen
tiren. Neben diesen durch schwache Consitution verursachten Todesfälle
wurden auch noch die durch Tuberculose, Wasserkopf, Rachitis un
Scrophulose verursachten Todesfälle mit in Betracht gezogen.

Die Beobachtungen wurden zum erstenmale in den fünf Jahren 1878-82 angestellt, dann in dem Jahre 1888-9 wieder aufgenommen. Angeborene Lebensschwäche, Wasserkopf, Rachitis und Scrophulose wurden alle sieben Jahre hindurch beobachtet, während Lungen tuberculose,* Inanitio und Atrophie, sowie die Frühgeburten erst in den letzten zwei Jahren hinzutraten.

Aus den gewonnenen Beobachtungen können wir zwar nicht schliessen, wieviel der Kinder verschiedenaltriger Eltern an Lungenschwindsucht, Lebensschwäche etc. gestorben seien, wohl aber, in welchem Masse sich die Anzahl dieser Todesfälle mit dem aufsteigenden Alter der Eltern ändere, was zu erkennen ja die eigentliche Endabsicht unserer Untersuchung bildet.

Wir werden im Nachstehenden untersuchen, zuerst welchen Einfluss das Alter der *Mütter*, dann welchen jenes der *Väter* ausgeübt, und schliesslich, welche Veränderungen die Alterscombination *beider* Gatten hervorbringe. Um uns ferner darüber zu vergewissern, ob die Altersverhältnisse wirklich einen speciellen Einfluss auf das Auftreten der uterinen Todesursachen ausüben, habe ich aus dem Kreise der extrauterinen Todesursachen noch jene eine in Betracht gezogen, welcher die meisten Kindesleben zum Opfer fallen, nämlich den Darmkatarrh.

Um die im Nachstehenden häufig zu erwähnenden Verhältnisse nicht stets durch eine schwerfällige und ermüdende Umschreibung bezeichnen zu müssen, wollen wir uns über folgende Ausdrücke verständigen: Kinder, deren Erzeuger in gleichem Alter standen, nennen wir kurz gleichaltrige; solche, wo die Väter gleichaltrig waren, vatersgleiche, wo die Mütter, muttersgleiche; jene Kinder, die von ältern Vätern stammen, vatersältere, die von ältern Müttern stammen, muttersältere, und vice versa vatersjüngere und muttersjüngere.

I. Einfluss des mütterlichen Alters.

Ueber die durch schwache Disposition angeborene Lebensschwäche, Athrophie Lungentuberculose und Frühgeburt verursachte Sterblichkeit enthalten die Tabellen zweijährige Beobachtungen; speciell bezüglich der angeborenen Lebensschwäche liegen auch siebenjährige Beobachtungen vor. Die weitern siebenjährigen Beobachtungen erstrecken sich auf die übrigen uterinen Todesursachen (Wasserkopf, Rachitis und Scrophulosis).

Diese Beobachtungen enthüllen nun die überaus wichtige Thatsache, dass die jüngsten Mütter (im Alter bis zu 20 Jahren)

* Die Tuberculose wurde eigentlich auch schon im ersten Zeitraume beobachtet. Aber in Folge des zweideutigen Sinnes der für Tuberculose angewendeten Ausdrücke —die Bezeichnungen "Schwindsucht" and "Auszehrung" können nämlich im Ungarischen (wie im Englischen "Consumption") ebenso für allgemeine Schwindsucht = Atrophie, als für Lungenschwindsucht = Lungentuberculose gedeutet werden, —ziehe ich es vor auf die Beobachtungen dieser Periode gar nicht zu reflectiren. Vom Jahre 1888 ab wurde aber zwischen Inanitio-Atrophie infantum und zwischen Lungentuberculose streng unterschieden. Die in vorliegender Abhandlung mit in Betracht gezogenen Ergebnisse der Jahre 1878-82 wurden im Jahre 1888 der ungarischen Academie der Wissenschaften vorgelegt; die Beobachtungen für 1888 und 1889 werden hier das erstemal veröffentlicht.

häufiger lebensschwache Kinder zur Welt bringen, und zwar trete hier nicht nur die durch angeborne Lebensschwäche verursachte sondern—in bemerkenswerther Uebereinstimmung—auch alle ander beobachteten Todesfälle auffällig häufiger auf.

Um vor Allem einen Ueberblick über das Gessammtbild zu bieten lassen wir nachstehend folgende Hauptzusammenstellung folgen:—

(1.) zweijährige Beobachtungen über den Einfluss des mütterliche Alters auf schwache Constitution;

(2.) siebenjährige Beobachtungen über den Einfluss auf di übrigen uterinen Todesursachen sammt angeborner Lebens schwäche.

Bei allen Todesursachen erfolgt noch die Vergleichung mit der Auftreten der wichtigsten der extrauterinen Todesursachen, nämlich m dem Darmkatarrh. Es ist klar, dass falls das Alter der Eltern vo Einfluss auf die Constitution und Widerstandskraft der Kinder is sich dieser Einfluss auch bei den extrauterinen Todesursachen (sowe diese nicht gewaltsamer Natur sind), also auch beim Darmkatarr müsste erkennen lassen; die Erwartung, dass die Häufigkeit diese Todesursachen ausser allem Zusammenhange mit dem elterlichen Alte stünde, wäre demnach eine unberechtigte. Wohl aber wird die Tha sache, dass die intrauterinen Todesursachen eine *grössere* Abhängigke von den Altersbeziehungen als die extrauterinen beweisen, als namhaft Bekräftigung des supponirten Causalnexus zwischen dem Alter de Erzeuger und der Vitalität der Erzeugten dienen.

Die Häufigkeit der uterinen Todesursachen bei der muttersgleiche Kinder ist nun die folgende:—

Alter der Mütter.	Zweijährige Beobachtungen.	Siebenjährige Beobachtungen.	
	Uterine Todesursachen.		Hingegen Darmkatarrh.
Bis 20 Jahren - -	37·32 %	22·31 %	26·29 %
Von 20–30 Jahren -	21·09 „	14·31 „	21·89 „
„ 30–35 „ -	14·04 „	12·85 „	18·05 „
Ueber 35 „ -	15·35 „	13·45 „	19·25 „

Um die mit dem wechselnden mütterlichen Alter vorgehende Veränderungen deutlicher erkennbar zu machen, wollen wir die Sterb lichkeitsverhältnisse der Altersklasse von 20–30 Jahren gleich 10 setzen. In diesem Falle gewinnen wir folgendes Bild:

Bis 20 Jahren - -	176	156	120
Von 20–30 Jahren -	*100*	*100*	*100*
„ 30–35 „ -	66	90	82
Ueber 35 „ -	73	94	88

Da die Altersgrenze von 20 Jahren bloss der runden Ziffer willen gewählt wurde, ist es von Interesse zu verfolgen, wie sich die Sterblichkeitsverhältnisse auf die einzelnen Altersjahre dieser Klasse auflösen. Leider ist für diese jüngsten Mütter so wenig Material zusammengekommen, dass für die besser specificirten Beobachtungen der letzten zwei Jahre Perzentualberechnungen nicht möglich sind; fasst man aber die siebenjährigen Beobachtungen zusammen, so hat man genug reichliches Material um behaupten zu können, dass je jünger die Mutter, desto häufiger der Fall, dass die Kinder lebensschwach zur Welt kommen.*

---

* Da man be Betrachtung blosser Verhältnisszahlen nicht sieht, wie gross die Menge der Beobachtungen gewesen, aus welchen dieselben hervorgehen, unterläuft hiebei stets die Gefahr, Verhältnisszahlen welche aus zu spärlichen Beobachtungen herrühren ein unverdientes Gewicht beizulegen. Auf Schritt und Tritt begegnen wir statistischen Berechnungen, wo bis in die hundertstel von Perzenten ausgerechnete Verhältnisszahlen bloss von einer Handvoll von Beobachtungen herrühren. Auf dem Gebiete der Medicinal-Statistik begegnet man solchen Berechnungen, namentlich bei den Nachweisungen des letalen Ausganges der verschiedenen Krankheiten, und zwar einerseits bei selten vorkommenden Krankheitsformen, anderseits bei häufig auftretenden, wo aber der letale Ausgang ein seltener ist. So hat z. B *Reitz* – in seiner "Kritik der Schutzpockenimpfung"—berechnet, dass im Berliner Pockenlazareth von den ungeimpften Pockenkranken 14 ganze und noch 28/100 Perzent gestorben seien; sieht man aber die absoluten Zahlen nach, so findet man, dass die Anzahl dieser Kranken im Ganzen *sieben* betrug! Ob auch von Tausend nur 14·28 % gestorben wären ist noch sehr fraglich, sicher aber, dass wenn zufällig noch ein Todesfall hinzugetreten wäre, die Letalität schon auf 14 ganze und 56/100 Perzent gestiegen wäre! Oft werden aber aus noch weniger zahlreichen Beobachtungen Percente herechnet; so führt *Reitz* selbst tadelnd jenes Beispiel eines Hospitals an, wo die Pockenletalität mit $33\frac{1}{3}$ % berechnet wurde, weil von *drei* Kranken einer starb.

Um solchen Missverständnissen auszuweichen, hat der Autor schon seit einigen Jahrzehnten solche geringwerthige Perzentual-Berechnungen mit gewissen Zeichen versehen. Von der Ansicht ausgehend, dass wo in Permillen gerechnet wird, die Gesammtheit der Beobachtungen von rechtswegen mindestens an 1000, wo man in Perzenten rechnet zum Mindesten 100 betragen müsste, hat derselbe solche Perzente, die aus weniger als 100 Fälle umfassenden Beobachtungen abgeleitet wurden, in Klammern gesetzt, um hiedurch auf das geringe Gewicht derselben aufmerksam zu machen; wo aber die Anzahl der Fälle weniger als 50 betrug, wurde die Perzentual-Berechnung ganz unterlassen und an die betreffende Stelle ein * gesetzt. Es wurde also eine Klammer angewendet, wenn z. B. von je 100 Kinder 17jähriger Mütter 25 % an Darmkatarrh starben, hiebei aber die Stammgesammtzahl dieser Kinder nur 56 betrug, wo also der *Nenner* des Sterblichkeitsbruches zu gering befunden wurde.

Nun giebt es aber Fälle wo diese Stammgesammtzahl eine genügend grosse, hingegen aber jene des Zählers zu selten sind. Bei physikalischen und chemischen Untersuchungen, wo wir es mit Naturkräften zu thun haben, spielt die Grösse weder der einen noch der andern Gesammtheit eine Rolle; wenn das eine Bitterwasser auch nur ein 1/10000 mehr Arsenik als das andere enthält, bringt es ohne Zweifel ganz verschiedene Heilwirkungen hervor. Nicht so in der Demographie und Sociologie, wo die Art des Messens und Wägens—schon infolge Complexität der Ursachen—nicht nur eine gröbere, sondern auch eine ganz anders geartete ist, und wo man diesen Ursachen—die man, insoweit sie unbekannt sind, mit dem Sammelnamen des "Zufalls" bezeichnet—auch sein Recht einräumen muss. Um die zufälligen Einflüsse zu eliminiren, verlangt man je zahlreichere Beobachtungen, also je grössere Stammgesammtheiten. Die Reichhaltigkeit dieser Stammgesammtheit macht es aber noch nicht allein. So gab es z. B. insgesammt wohl 11,314, also genug zahlreiche Kinderverstorbene aus Ehen, wo die Mütter im Alter von

Es erübrigt nur noch, in eine Spezifikation der Altersgruppe von über 35 Jahren nach kleineren Altersstufen einzugehen. Es ergiebt sich hiebei, dass ungefähr bis zum 40sten Jahre die genannten uterinen Todesursachen im Ganzen genommen seltener aufzutreten pflegen. Da auch die Todesfälle an Darmkatarrh selbst an dieser äussersten Grenze des weiblichen Zeugungsalters nicht häufiger, eher seltener, vorkommen, liesse sich aus diesen Beobachtungen ein ungünstiger Einfluss spätgebärender Mütter nicht constatiren, wenn nicht bei zwei Todesursachen, nämlich bei Rachitis, noch mehr aber bei der wichtigen Lungentuberculose, sich gegen das Ende der Zeugungsperiode (etwa vom 38ten Jahre aufwärts) eine Steigerung der Häufigkeit bemerkbar machen würde. Hier die betreffenden Ergebnisse:

Alter der Mütter.	Zweijährige Beobachtungen.			Hingegen Darmkatarrh.
	Lungentuberculose.	Atrophie.	Angeborne Lebensschwäche.	
35–37 Jahre -	2·84	2·57	6·09	16·94
37–39 „ -	2·71	3·88	6·98	18·64
39–41 „ -	5·82	3·29	12·15	23·54
41–43 „ -	13·18	*	6·59	19·28
43–45 „ -	*	*	(7·31)	(11·65)
Ueber 45 Jahre	—	*	*	—

Alter der Mütter.	Siebenjährige Beobachtungen.				
	Angeborne Lebensschwäche.	Hydrocephalus.	Rachitis.	Scrophulosis.	Hingegen Darmkatarrh.
35–37 Jahre -	10·39	1·59	0·66	0·66	19·43
37–39 „ -	11·09	1·08	(0·51)	(0·57)	20·01
39–41 „ -	12·78	1·29	1·29	0·46	18·78
41–43 „ -	9·89	(1·39)	1·39		19·32
43–45 „ -	8·30	*	*		16·61
Ueber 45 Jahre	8·15	—	*		16·67

II. Einfluss des väterlichen Alters.*

Es ist vorauszusehen, dass das Alter des Vaters nicht von so grossem Einfluss auf die Lebensdauer des Kindes sein werde, als das der Mutter, deren Constitution ausser dem im Zeugungsakte agirenden Impulse auch durch die monatelange Ernährung des Kindes einen so

* Es muss bemerkt werden, dass die siebenjährige Aufarbeitung der Väter zu einer späteren Zeit und durch andere Personen, als jene der Mütter erfolgte. Dies erklärt dann die geringen Differenzen der beiden Tabellen, so z. B., dass die Tabelle der Väter sich auf 29,819, jene der Mütter auf 29,813 Verstorbene bezieht; dass für angeborne Lebensschwäche hier 3,220 dort 3,252, für Wasserkopf hier 416 dort 413 Fälle nachgewiesen sind. Solche Abweichungen sind bei Massenaufarbeitungen bekanntlich unausweichlich; die Geringfügigkeit derselben ist im Gegentheile der beste Beweis für die Verlässlichkeit beider Aufarbeitungen.

wichtigen Einfluss auf dessen physische Entwicklung ausübt. D stärksten, lebenskräftigsten Kinder scheinen bei Vätern im Alter v 30–40 Jahren vorzukommen*; die Kinder der unter 30jährigen u die der 40–50jährigen Väter sterben schon etwas häufiger an uterine Todesursachen.

Ueberaus auffällig bleibt es jedoch hiebei, dass in den höchste Altersklassen, etwa bei Vätern von über 60 Jahren, die Vitalität d Kinder wieder zuzunehmen scheint. Wir finden keine befriedigen Erklärung für diese unerwartete Wendung möglich, dass Umständ welche dort, wo der Ehemann um ein Beträchtliches älter ist, au nahmsweise auftreten, von Einfluss auf die Gestaltung des statistische Durchschnittes sind. Es wäre uns aber geradezu angenehm, fal unsere diesbezügliche Behauptung durch anderweitige und reiche Beobachtungen widerlegt werden sollte.

Lassen wir auch hier zuerst eine Uebersicht der Ergebnisse folgen

Unter je 100 Verstorbenen bildete die Todesursache:

Alter der Väter.	Zweijährige Beobachtungen.	Siebenjährige Beobachtungen.	
	Uterine Todesursachen.		Hingegen Darmkatarrh.
Bis 25 Jahre - -	20·41	14·57	19·31
„ 25–30 Jahre - -	18·27	14·13	23·02
„ 30–40 „ - -	17·05	12·92	20·03
„ 40–50 „ - -	21·46	16·02	21·10
Ueber 50 „ - -	10·14	11·96	18·44

Die Väter unter 25 Jahren sind mit so wenigen Fällen vertrete dass eine Spezifizirung derselben nach einzelnen Altersjahren d Material in zu kleine Bruchstücke zersplittern würde.† Wohl aber i eine Spezifizirung der ältesten Altersklasse möglich.

* D. h. richtiger gesprochen, bei den Kindern dieser Altersklasse komm lebensschwache Kinder am seltensten vor; der bündigeren Ausdrucksweise zu lie wird man diese Umkehrung—die schliesslich auch in der Natur der Sac begründet ist—gestatten.

† Ich gedenke diese Beobachtungen auch in der Zukunft fortzusetzen, wo da nicht nur für diese jüngsten Väter, sondern im Allgemeinen bezüglich des ganz Materials eine eingehendere Detaillirung der Altersklassen Platz greifen sol freilich wird man dann Jahrzehnte lang Material sammeln müssen, bis z. B. f 19 oder 20jährige Väter genügend reiche Beobachtungen zusammen komme Eine schon im heurigen Jahre zu erschliessende, überaus reiche Quelle einschlägig Beobachtungen enthält aber die Volkszählung vom Jahre 1891, wo ich für Budape auch noch folgende Fragen beantworten liess:

1. Name und Alter des Familienhauptes.
2. Alter der Gattin.
3. Seit wieviel Jahren verheirathet.
4. Religion } des Familienhauptes.
5. Beschäftigung }
6. Wie viele Kinder wurden in dieser Ehe lebend geboren?
7. Wie viele sind von diesen Kindern (incl. der Abwesenden) am Leben?

Dieselbe ergiebt nun folgende Resultate (Da die zweijährigen Beobachtungen von zu geringer Anzahl sind, müssen wir uns im Nachfolgenden auf jene weniger eingehend spezifizirten Todeswsachen beschränken, welche die siebenjährigen Beobachtungen enthalten) :—

Alter der Väter.	Angeborne. Lebensschwäche, Wasserkopf, Rachitis, Scrophulose.	Darmkatarrh.
50–55 Jahre - - -	10·29 %	19·46 %
55–57 „ - - -	(12·63)	(13·68)
57–61 „ - - -	(20·98)	(17·28)
Ueber 61 Jahre - -	(14·57)	(18·18)

Es erübrigt nun auch hier noch, die Gruppe der uterinen Todesursachen in die einzelnen Krankheiten aufzulösen, wobei wir aber die durch Frühgeburt verursachten Todesfälle, der unzulänglichen Anzahl halber, unberücksichtigt lassen müssen.

Alter der Väter.	Zweijährige Beobachtungen.		Siebenjährige Beobachtungen.			
	Lungen-tuberculose.	Atrophie.	Angeborne Lebensschwäche.	Wasser-kopf.	Rachitis.	Scrophulose.
Bis 25 Jahre -	5·71	3·30	7·75	11·37	1·43	1·21	*
„ 25–30 Jahre	4·74	3·90	9·27	11,38	1·13	0·88	0·74
„ 30–40 „ -	3·61	4·49	8·31	10·06	1·45	0·77	0·64
„ 40–50 „ -	6·01	5·25	9·89	12·68	1·49	0·70	1·17
Ueber 50 „	*	*	5·80	9·16	1·53	(1·02)	*

Man sieht also, wie, gleich den mutterjüngsten kindern, auch jene der unter 25jährigen Väter keineswegs als günstig gestellt betrachtet werden können. Mit Ausnahme der Atrophie stehen dieselben bei keiner der angeführten Todesursache günstiger als die Kinder der 25–30 oder 30–40jährigen Väter; bei einzelnen Todesursachen, so z. B. bei Rachitis und Lungentuberculose, zeigt sich sogar eine verdächtige Verschlechterungstendenz, über welche sich aber bei der geringen Menge der vor liegenden Beobachtungen gegenwärtig noch nichts Bestimmtes aussagen lässt.

III. Einfluss des Alters beider Eltern.

Die diesbezüglichen Untersuchungen können nach zwei Richtungen angestellt werden: einmal um zu erkennen, welchen Einfluss es genommen, falls—wie dies in der Mehrzahl der Ehen der Fall ist—der Vater die Mutter an Alter übertrifft, ferner falls beide gleichaltrig sind, oder falls die Mutter älter als der Vater ist. Neben diesen, den Einfluss des *Altersunterschiedes* im Auge haltenden Untersuchungen, sind aber

Da nun diese Fragen für eine halbe Million Menschen, also über 100,000 Ehen auf einmal beantwortet wurden, dürfte im Depouillement der Altersverhältnisse eine viel reichere Aufarbeitung als in der Mortalitätsstatistik möglich werden. Ich hoffe einen Theil der Ergebnisse der nächsten Sitzung des internationalen statistischen Instituts unterbreiten zu können.

auch noch solche angezeigt, welche den Einfluss *der Alterscombination* beider Eltern erkennen lassen.

(*a.*) *Einfluss des Altersunterschiedes.*

Da das Alter der Ehegatten nicht nach einzelnen Jahren, sondern nach Altersgruppen aufgearbeitet wurde, kann die Auftheilung nach mutterjüngern, gleichaltrigen oder mutterälteren Ehen nur eine annähernde sein.*

Die vorliegenden Beobachtungen lassen keinen bemerkenswerthen Einfluss dieser Altersunterschiede auf die intrauterinen Todesursachen erkennen, und auch die Betrachtung des Darmkatarrhs lässt die Wahrscheinlichkeit eines Einflusses des elterlichen Alters nach dieser Richtung hin noch precärer erscheinen, indem bei mutterjüngeren Ehen 21·5 %, bei gleichaltrigen 19·81 %, bei muttersältern 23·53 % der verstorbenen Kinder dem Darmkatarrh erlegen waren.

Für uterine Todesursachen gewinnen wir nämlich folgende Ergebnisse:

(a.) *Zweijährige Beobachtungen.*

—	Insgesammt verstorben.	Hievon an				
		angeborner Lebensschwäche.	Lungentuberculose.	Atrophie.	Frühgeburt.	Zusammen.
Mutterjüngere Ehe	3,105	301	137	149	17	604
Gleichaltrige „	5,117	415	217	212	30	874
Mutterältere „	170	14	5	9	—	28
	8,392	730	359	370	47	1,506

(b.) *Siebenjährige Beobachtungen.*

—	Insgesammt verstorben.	Hievon in Folge von				
		angeborner Lebensschwäche.	Wasserkopf.	Rachitis.	Scropheln.	Zusammen.
Mutterjüngere Ehe	12,098	1,339	183	100	118	1,740
Gleichaltrige „	17,222	1,865	219	142	102	2,328
Mutterältere „	493	48	11	4	4	67
	29,813	3,252	413	246	227	4,135

* Diese Klassirung der vorgekommenen Alterscombinationen in die drei Gruppen erfolgt in nachstehender Weise. Wir haben als mutterjüngere Ehen jene angenommen, wo Mütter von unter 20 Jahren mit Vätern über 20 Jahren, Mütter von 20–30 Jahren mit Vätern über 30 Jahren und Mütter von 30–35 Jahren mit Vätern von über 40 Jahren verheirathet waren; als gleichaltrige:—Mütter bis 20 Jahren mit Vätern bis 20 Jahren, Mütter von 20–30 Jahren mit Vätern von 20–30 Jahren, Mütter von 30–35 Jahren mit Vätern von 30–40 Jahren und Mütter über 35 Jahren mit Vätern über 30 Jahren; schliesslich als muttersältere Ehen: Mütter von 20–30 Jahren mit Vätern unter 20 Jahren, Mütter von 30–35 Jahren mit Vätern von 20–30 Jahren und Mütter von über 35 Jahren mit Vätern von 20–30 Jahren.

Die an je einer der angeführten Todesursachen Verstorbenen betragen nachfolgenden Perzentsatz der insgesammt verstorbenen Kinder:

—	Zweijährige Beobachtungen.				Siebenjährige Beobachtungen.			
	Lungentuberculose.	Atrophie.	Frühgeburt.	Angeborne Lebensschwäche.	Wasserkopf.	Rachitis.	Scropheln.
Mutterjüngere -	4·41	4·79	0·55	9·70	11·07	1·51	0·82	0·98
Gleichaltrige -	4·24	4·14	0·59	8·11	10·83	1·27	0·82	0·59
Mutteraltere -	*	(5·29)	—	8·24	9·74	2·23	*	*

Wir sahen vorher, wie selbst an der Grenze des weiblichen Zeugungsalters kaum schwächere Kinder zur Welt kommen, als in den mittleren Altersperioden; diesem Umstande ist es zuzuschreiben, wenn auch bei Betrachtung des Altersunterschiedes beider Gatten das höhere Alter der Frau kaum einen fühlbaren Einfluss auf die Lebenskraft der Kinder äussert. Nur in den extremen Fällen, und zwar dort, wo das Alter des Vaters ein bedeutend höheres ist, scheint eine ungünstigere Wendung einzutreten. Untersucht man z. B. jene Fälle, wo die Mutter 20–35 Jahre, der Vater aber über 50 Jahre alt ist, so ergeben sich für diese seltener vorkommende Combinationen im Laufe der siebenjährigen (gegen 10·83 % bei gleichaltrigen Ehen) Beobachtung im Ganzen 270 verstorbene Kinder, hierunter starben 36 = *13·3* % an angeborner Lebensschwäche; 11 = *4·1* % an Wasserkopf (gegen bloss 1⅓ % bei gleichaltrigen): in diesen extremsten Fällen ist also doch ein ungünstiger Einfluss des grossen väterlichen Altersvorsprunges—vielleicht auch des absolut hohen väterlichen Alters—zu constatiren.

Diese Betrachtungen leiten aber zu dem letzten Theile unserer Untersuchung über, wo wir den mehr durchschnittlichen Begriff des jüngeren oder höheren Alters, durch Berücksichtigung der einzelnen Alterscombinationen in seine Elemente auflösen wollen.

(*b.*) *Einfluss der Alterscombination.*

Zerfällt man das vorliegende Material noch nach den einzelnen Alterscombinationen der Ehepaare, so zersplittert sich dasselle in so bedeutendem Masse, dass die zweijährigen Beobachtungen sich also zu geringzählig erwiesen, in Folge dessen nur jene vier uterine Todesursachen (nämlich angeborne Lebensschwäche, Wasserkopf, Rachitis und Scropheln), für welche siebenjährige Beobachtungen vorliegen, desgleichen auch der ebenfalls durch sieben Jahre beobachtete Darmkatarrh in Betracht gezogen werden soll. Wir werden hiebei zuerst von einer gegebenen Altersklasse der Mütter ausgehen und untersuchen, wie sich die Häufigkeit der einzelnen Todesursachen mit dem aufsteigenden Alter der Väter ändere, und dann dasselbe für die Väter wiederholen indem wir beobachten, wie in ein und derselben Altersklasse der Männer sich die Vitalität der Kinder mit dem aufsteigenden Alter der Mütter ändere.

(*a.*) *Mütter.* Für die unter zwanzigjährigen Frauen liegt nur aus zwei Altersklassen der Väter (20–30 und 30–40 Jahre) und nur für

die eine Todesursache der angebornen Lebensschwäche, genügende Material vor. Es scheint, dass die Vereinigung jüngster Mütter mit älteren Vätern einen ungünstigen Einfluss ausübe: das Totale sämmtlicher angeführten Todesursachen steigt nämlich von 21 °/₀ der jüngeren Väter bei den ältern Vätern auf 28 °/₀. Da bei Darmkatarrh fast gar keine Steigerung bemerkt werden kann (nämlich bloss von 25½ auf 26 °/₀), dürfte vorläufig angenommen werden, dass diese Alterscombination speziell auf die uterinen Todesursachen einen ungünstigen Einfluss ausübe.

Mütter im Alter von 20–30 Jahren zeigen in Verbindung mit um 10 Jahren älteren Männern die günstigsten Verhältnisse, etwas ungünstigere mit jüngeren oder um 20 Jahre älteren Männern, während die Verbindung mit noch älteren (über 50jährigen) Männern das Auftreten der uterinen Todesursachen am meisten zu begünstigen scheint. Der extrauterine Darmkatarrh tritt bei allen Combinationen ungefähr mit gleicher Intensität auf; die verhältnissmässig grösste Anschwellung desselben ergiebt sich für die jüngsten (20–30jährigen) Väter. Die diesbezüglichen Ergebnisse stellen sich wie folgt:

Mütter im Alter von 20–30 Jahren.

Alter der Väter.	Angeborne Lebensschwäche.	Wasserkopf.	Rachitis.	Scropheln.	Zusammen.	Darmkatarrh.
20–30 Jahre -	12·40	1·07	*1·20*	0·67	15·36	*23·36*
30–40 „ -	10·48	1·25	0·77	0·74	13·24	21·31
40–50 „ -	*13·31*	*2·54*	(0·89)	*1·77*	18·51	19·14
Ueber 50 Jahre	(9·09)	(10·10)	(*)	—	*21·21*	(19·19)

Bei den Müttern im Alter von 30–35 Jahren steigen die uterinen Todesursachen in jenen Ehen, wo der Vater 40–50 oder über 50 Jahre alt war. Die Verehelichung mit 10–15 Jahren jüngeren Männern scheint aber manchmal ebenfalls von üblen Folgen, namentlich von etwas häufigerem Auftreten des Wasserkopfes begleitet zu sein. Diesen positiven Behauptungen gegenüber beweist die sprunghaft wechselnde Intensität des extrauterinen Darmkatarrhs recht augenscheinlich, wie das Alter des Vaters hier von grösserem Einfluss auf die uterinen als auf die extrauterinen Todesursachen ist:

Mütter im Alter von 30–35 Jahren.

Alter der Väter.	Angeborne Lebensschwäche.	Wasserkopf.	Rachitis.	Scropheln.	Zusammen.	Darmkatarrh.
20–30 Jahre -	7·59	*2·88*	*	*	12·30	*23·04*
30–40 „ -	9·54	1·42	0·51	0·55	12·02	17·33
40–50 „ -	10·85	1·70	0·85	2·00	15·40	19·03
Ueber 50 Jahre	*15·79*	*	*	*	*17·54*	21·63

Im reiferen Alter von über 35 Jahren stehende Frauen haben bei Verbindung mit 30, 40, 50 und auch über 50jährigen Männern keine ungünstigen Chancen zu befürchten; wohl scheint es aber, dass in diesem Alter die Verbindung mit bedeutend jüngeren Männern nicht räthlich ist, wie dies folgende Ergebnisse wahrscheinlich machen:

MÜTTER IM ALTER ÜBER 35 JAHREN.

Alter der Väter.	Angeborne Lebensschwäche.	Wasserkopf.	Rachitis.	Scropheln.	Zusammen.	Darmkatarrh.
20–30 Jahre -	(*17·77*)	—	(*)	—	(*18·89*)	(*25·56*)
30–40 „ -	9·79	1·75	0·79	0·48	12·81	18·80
40–50 „ -	11·32	1·10	0·80	0·67	13·89	19·39
Ueber 50 Jahre	10·85	*	*	*	12·68	19·03

Es liesse sich also höchstens für jene Fälle eine ungünstige Tendenz voraussetzen, wo bei Frauen im Alter von über 35 Jahren die Männer den jüngsten Alterklassen angehören.

(*b.*) *Väter.* Die bisher mitgetheilten Beobachtungen enthalten zugleich Aufschlüsse über die Art und Weise, wie das höhere oder niedrigere Alter des Vaters die Vitalitäts-Chancen der Kinder beeinflusst. Da es sich bei Aufstellung der einschlägigen Tabelle um die in veränderter Reihenfolge zu vollführende Aufzählung der oben angegebenen Verhältnisszahlen handelt, begnügen wir uns damit, die Ergebnisse wie folgt zusammenzustellen:

Alter der Mütter.	Angeborne Lebensschwäche.	Wasserkopf.	Rachitis.	Scropheln.	Zusammen.	Darmkatarrh.
(a.) *Väter von* 20–30 *Jahren.*						
20 Jahre -	17·42	(2·41)	*	*	*21·71*	25·51
20–30 „ -	12·40	1·07	1·20	0·67	15·36	23·86
30–35 „ -	7·59	2·88	*	*	12·30	23·04
Ueber 35 Jahre	(*17·77*)	—	*	—	(18·89)	(25·56)
(b.) *Väter von* 30–40 *Jahren.*						
20 Jahre -	*20·19*	*	*	*	*27·88*	*25·96*
20–30 „ -	10·48	1·25	0·77	*0·74*	13·24	21·31
30–35 „ -	9·54	1·42	0·51	0·55	12·02	17·33
Ueber 35 Jahre	9·79	*1·75*	*0·79*	0·48	12·81	18·80
(c.) *Väter von* 40–50 *Jahren.*						
20 Jahre -	13·31	2·54	0·89	1·77	18·51	19·14
30–35 „ -	10·85	1·70	0·85	2·00	15·40	19·03
Ueber 35 Jahre	11·32	1·10	0·80	0·67	13·89	19·39
(d.) *Väter über* 50 *Jahre.*						
20–30 Jahre -	(9·09)	(10·10)	*	—	(21·21)	19·19
30–35 „ -	15·79	(*)	*	*	17·54	21·68
Ueber 35 Jahre	10·85	(*)	*	*	12·68	19·03

Als besonders auffallend ergibt sich die Verschlechterung der Chancen für jene Ehen, wo die jüngsten der in Betracht ziehbaren

i p. 2596. 8

auszusprechen, dass Frauen im Alter unter 30 Jahren, ja auch noch zwischen 30 und 35 Jahren, es sich überlegen sollten mit über 50jährigen Männern zur Ehe zu schreiten.

Aus unseren Beobachtungen ergeben sich aber zwei weitere Facten, die, falls sie auch anderweitig Bestätigung fänden, umso eher Beachtung verdienten, als man auf bloss instinktivem Wege kaum zur Erkenntniss derselben gelangen dürfte, nämlich, dass Frauen im reifern Alter von über 35 Jahren bei Wahl eines Gatten von über 50 Jahren keine ungünstigen Chancen zu befürchten haben; dass hingegen diese Frauen, ja selbst jene zwischen 30 und 35 Jahren, ihre Kinder häufiger dem Wasserkopf und der angebornen Lebensschwäche exponiren, wenn sie junge Männer zu ihren Gatten wählen.

Die Winke, welche sich aus unseren Beobachtungen für die Männer ergeben, sind in dem Vorgebrachten schon mit enthalten: diese sollten im Allgemeinen Mädchen unter 19 Jahren nicht zur Ehe wählen; ferner scheint es im Alter von 20–30 Jahren nicht empfehlenswerth Frauen im reifsten Alter von über 35 Jahren zu wählen; dessgleichen sollten der Grenze des Zeugungsalters sich nähernde Männer von über 50 Jahren keine jüngeren als 35, eventuell 30 Jahre alten Frauen zur Gattin wählen.

Schliesslich kann nicht oft genug wiederholt werden, dass die obigen Ergebnisse noch durchaus keinen Anspruch auf allgemeine Giltigkeit erheben und dass es noch zahlreicher und an den verschiedensten Orten zu wiederholender solcher Untersuchungen bedürfte, bis man über so wichtige Fragen ein entscheidendes statistisches Urtheil wagen könnte.

TABELLE NO. 1.—EINFLUSS DES ALTERS DER MUTTE

ALTER DER MÜTTER.		Bis 20 Jahre.							
		Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	
Unter 17 Jahren.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	1	—	—	—	—	—	
Zusammen	—	—	1	—	—	—	—	?	
17–18.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	
Zusammen	—	—	—	—	—	—	—	?	
18–19.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	
Zusammen	—	—	—	—	—	—	—	?	
19–20.	1878-82	—	?	1	—	—	1	?	
	1888-89	—	—	1	—	—	—	—	
Zusammen	—	—	—	2	—	—	1	?	
20–30.	1878-82	—	?	3	—	—	3	?	
	1888-89	—	—	—	—	—	—	—	
Zusammen	—	—	—	3	—	—	3	?	
30–35.	1878-82	—	?	1	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	
Zusammen	—	—	—	1	—	—	—	?	
Ueber 35 Jahre.	1878-82	—	?	1	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	
Zusammen	—	—	—	1	—	—	—	?	
—	1878-82	—	?	6	—	—	4	?	
	1888-89	—	1	1	—	—	—	—	
Total-Summe	—	—	1	7	—	—	4	?	

* Diese Rubrik enhält die Summe *aller* bis mit 10 Jahren verstorbenen Kinder, also auch d
als den oben specificirten Todesursachen Verstorbenen.

DESURSACHE DER KINDER; IN COMBINATION MIT DEM ALTER TERS.

ALTER VON:	20–30.								30–40.							
	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10j.*	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10j.*
-	?	1	—	—	2	?	?	8	—	?	—	—	—	1	?	?	3
-	—	3	—	—	1	—	—	5	—	—	—	—	—	—	—	—	—
-	?	4	—	—	3	?	?	13	—	?	—	—	—	1	?	?	3
1	?	1	1	2	3	?	?	31	—	?	—	—	—	—	?	?	—
-	4	12	—	—	2	—	2	24	—	—	1	—	—	—	—	—	1
1	?	13	1	2	5	?	2	55	—	?	1	—	—	—	?	?	1
1	?	13	1	—	16	?	?	66	1	?	2	2	1	4	?	?	26
-	4	7	—	—	7	2	1	22	1	—	4	—	—	2	—	—	7
1	?	20	1	—	23	?	?	88	2	?	6	2	1	6	?	?	33
3	?	26	2	1	25	?	?	161	—	?	13	—	—	10	?	?	48
1	1	32	—	—	9	7	—	56	2	1	7	1	—	4	4	—	19
1	?	58	2	1	34	?	?	217	2	?	20	1	—	14	?	?	67
2	?	761	34	22	489	?	?	3,905	89	?	1,268	41	50	717	?	?	6,621
4	84	461	29	13	160	73	8	1,325	22	92	628	28	16	215	109	12	2,277
5	?	1,222	63	35	640	?	?	5,230	111	?	1,896	69	66	932	?	?	8,898
3	?	51	2	4	18	?	?	234	63	?	656	18	24	449	?	?	4,019
4	3	37	1	—	11	8	—	148	20	49	356	12	8	108	79	12	1,818
1	?	88	3	4	29	?	?	382	83	?	1,012	30	32	557	?	?	5,837
-	?	16	1	—	13	?	?	68	29	?	299	16	9	175	?	?	1,559
-	2	7	—	—	3	1	—	22	11	28	131	2	2	49	22	6	727
-	?	23	1	—	16	?	?	90	40	?	430	18	11	224	?	?	2,286
4	?	869	41	29	566	?	?	4,473	182	?	2,238	77	84	1,356	?	?	12,276
3	98	559	30	13	193	91	11	1,602	56	170	1,127	43	26	378	214	30	4,849
5	?	1,428	71	42	759	?	?	6,075	238	?	3,365	120	110	1,734	?	?	17,125

* S. Note auf p. 276.

TABELLE NO. 1.—EINFLUSS DES ALTERS DER M

ALTER DER MÜTTER.	—	20—50.							
		Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Fehlgeburten
Unter 17 Jahren	1878-82	—	?	—	—	—	—	?	1
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	1
17—18.	1878-82	—	?	—	—	—	—	?	1
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	1
18—19.	1878-82	—	?	1	—	—	—	?	1
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	1	—	—	—	?	?
19—20.	1878-82	—	?	1	—	—	1	?	?
	1888-89	—	1	2	—	—	—	—	—
Zusammen	—	—	?	3	—	—	1	?	?
20—30.	1878-82	12	?	113	6	8	86	?	?
	1888-89	8	18	38	1	6	19	9	—
Zusammen	—	20	?	151	7	14	105	?	?
30—35.	1878-82	21	?	234	14	10	141	?	?
	1888-89	7	13	80	—	23	38	16	—
Zusammen	—	28	?	314	14	33	179	?	?
Ueber 35 Jahre.	1878-82	32	?	465	22	18	284	?	?
	1888-89	4	44	167	4	4	85	36	4
Zusammen	—	36	?	632	26	22	369	?	?
—	1878-82	65	?	814	42	36	512	?	?
	1888-89	19	76	287	5	33	142	61	4
Total-Summe	—	84	?	1,101	47	69	654	?	?

* S. Note auf p. 276.

AUF DIE TODESURSACHE DER KINDER—*Fortsetzung.*

IM ALTER VON

Ueber 50.									Zusammen.								
Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10*.	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10*.
—	?	—	—	—	—	?	?	—	—	?	1	—	—	3	?	?	11
—	—	—	—	—	—	—	—	—	—	1	3	—	—	1	—	—	6
—	?	—	—	—	—	?	?	—	—	?	4	—	—	4	?	?	17
—	?	—	—	—	—	?	?	—	1	?	1	1	2	3	?	?	31
—	—	—	—	—	—	—	—	—	—	4	13	—	—	2	—	2	25
—	?	—	—	—	—	?	?	—	1	?	14	1	2	5	?	?	56
—	?	—	—	—	—	?	?	—	2	?	16	3	1	20	?	?.	96
—	—	3	—	—	—	—	—	3	1	4	14	—	—	9	2	1	32
—	?	3	—	—	—	?	?	3	3	?	30	3	1	20	?	?	128
—	?	1	—	—	—	?	?	3	6	?	42	2	1	37	?	?	222
—	—	—	—	—	—	—	—	—	3	3	42	1	—	13	11	—	79
—	?	1	—	—	—	?	?	3	9	?	84	3	1	50	?	?	301
8	?	14	2	—	8	?	?	82	151	?	2,159	83	80	1,303	?	?	11,225
2	—	5	—	—	1	1	2	17	46	194	1,132	58	35	395	192	22	3,807
10	?	19	2	—	9	?	?	99	197	?	3,291	141	115	1,698	?	?	15,032
—	?	29	1	1	24	?	?	121	92	?	971	35	39	632	?	?	5,594
1	3	8	—	—	3	1	—	50	31	68	481	13	31	160	104	12	2,450
1	?	37	1	1	27	?	?	171	123	?	1,452	48	70	702	?	?	8,044
2	?	72	3	1	52	?	?	380	63	?	853	42	28	524	?	?	4,242
2	11	42	2	1	13	2	—	219	17	85	347	8	7	150	61	10	1,993
4	?	114	5	2	65	?	?	599	80	?	1,200	50	35	674	?	?	6,235
10	?	116	6	2	84	?	?	586	315	?	4,043	166	151	2,522	?	?	21,421
5	14	58	2	1	17	4	2	289	98	359	2,032	80	73	730	370	47	8,392
15	?	174	8	3	101	?	?	875	413	?	6,075	246	224	3,252	?	?	29,813

* S. Note auf p. 276.

Anhang zu Tabelle No. 1.—Sp

Alter der Mütter.	—	Bis 20 Jahre.							
		Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	
35—37.	1878-82	—	?	1	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	1	—	—	—	?	
37—39.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	
39—41.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	
41—43.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	
43—45.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	
Ueber **45** Jahre.	1878-82	—	?	—	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	
—	1878-82	—	?	1	—	—	—	?	
	1888-89	—	—	—	—	—	—	—	—
Total-Summe	—	—	?	1	—	—	—	?	

* S. Note auf p. 276.

des Alters der über 35jährigen Mütter.

20–30.									30–40.								
Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10j.*	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10j.*
—	?	7	—	—	7	?	?	22	14	?	140	6	6	87	?	?	729
—	2	3	—	—	2	1	—	9	8	13	53	2	—	21	7	1	386
—	?	10	—	—	9	?	?	31	22	?	193	8	6	108	?	?	1,115
—	?	2	—	—	3	?	?	19	8	?	107	3	3	53	?	?	512
—	—	1	—	—	1	—	—	8	2	6	50	—	1	12	11	3	223
—	?	3	—	—	4	?	?	27	10	?	157	3	4	65	?	?	735
—	?	2	1	—	1	?	?	14	6	?	39	6	—	27	?	?	208
—	—	1	—	—	—	—	—	3	1	9	21	—	1	16	3	—	86
—	?	3	1	—	1	?	?	17	7	?	60	6	1	43	?	?	294
—	?	4	—	—	2	?	?	6	1	?	3	1	—	5	?	?	65
—	—	1	—	—	—	—	—	1	—	—	2	—	—	—	—	2	18
—	?	5	—	—	2	?	?	7	1	?	5	1	—	5	?	?	83
—	?	—	—	—	—	?	?	4	—	?	7	—	—	2	?	?	24
—	—	1	—	—	—	—	—	1	—	—	3	—	—	—	1	—	9
—	?	1	—	—	—	?	?	5	—	?	10	—	—	2	?	?	33
—	?	1	—	—	—	?	?	3	—	?	3	—	—	1	?	?	21
—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	5
—	?	1	—	—	—	?	?	3	—	?	5	—	—	1	?	?	26
—	?	16	1	—	13	?	?	68	29	?	299	16	9	17	?	?	1,559
—	2	7	—	—	3	1	—	22	11	28	131	2	2	4	22	6	727
—	?	23	1	—	16	?	?	90	40	?	430	18	11	25	?	?	2,286

* S. Note auf p. 276.

Anhang zu Tabelle No. 1.—*Specific*

Alter der Mütter.		40—50.							
	—	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeborn.
35—37.	1878-82	11	?	127	4	5	74	?	?
	1888-89	1	3	59	1	1	21	9	2
Zusammen	—	12	?	186	5	6	95	?	?
37—39.	1878-82	7	?	138	6	5	89	?	?
	1888-89	1	8	35	—	1	20	9	—
Zusammen	—	8	?	173	6	6	109	?	?
39—41.	1878-82	7	?	88	3	2	65	?	?
	1888-89	1	10	45	3	1	26	10	—
Zusammen	—	8	?	133	6	3	91	?	?
41—43.	1878-82	6	?	66	7	1	35	?	?
	1888-89	—	22	23	—	1	10	3	1
Zusammen	—	6	?	89	7	2	45	?	?
43—45.	1878-82	1	?	20	1	2	11	?	?
	1888-89	1	1	3	—	—	5	1	1
Zusammen	—	2	?	23	1	2	16	?	?
Ueber 45 Jahre.	1878-82	—	?	26	1	3	10	?	?
	1888-89	—	—	2	—	—	3	4	—
Zusammen	—	—	?	28	1	3	13	?	?
—	1878-82	32	?	465	22	18	284	?	?
	1888-89	4	44	167	4	4	85	36	4
Total-Summe	—	36	?	632	26	22	369	?	?

* S. Note auf p. 276.

***Alters der über 35jährigen Mütter*—Fortsetzung.**

Ueber 50.									Zusammen.								
Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10.*	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10.*
—	?	15	—	1	9	?	?	68	25	?	200	10	12	177	?	?	1,388
—	3	10	1	1	1	2	—	40	9	21	125	4	2	45	19	3	738
—	?	25	1	2	10	?	?	108	34	?	415	14	14	222	?	?	2,126
—	?	8	—	—	13	?	?	61	15	?	255	9	8	158	?	?	1,234
1	—	9	—	—	3	—	—	39	4	14	95	—	2	36	20	3	515
1	?	17	—	—	16	?	?	100	19	?	350	9	10	194	?	?	1,749
—	?	17	2	—	8	?	?	74	13	?	146	12	2	101	?	?	771
—	4	6	—	—	6	—	—	49	2	23	73	3	2	48	13	—	395
—	?	23	2	—	14	?	?	123	15	?	219	15	4	149	?	?	1,166
2	?	17	—	—	10	?	?	81	9	?	90	8	1	52	?	?	465
—	2	9	1	—	2	—	—	39	—	24	35	1	1	12	3	3	182
2	?	26	1	—	12	?	?	120	9	?	125	9	2	64	?	?	647
—	?	7	—	—	4	?	?	41	1	?	34	1	2	17	?	?	195
1	2	5	—	—	1	—	—	17	2	3	12	—	—	6	2	1	82
1	?	12	—	—	5	?	?	58	3	?	46	1	2	23	?	?	277
—	?	8	1	—	8	?	?	55	—	?	38	2	3	19	?	?	189
—	—	3	—	—	—	—	—	35	—	—	7	—	—	3	4	—	81
—	?	11	1	—	8	?	?	90	—	?	45	2	3	22	?	?	270
2	?	72	3	1	52	?	?	380	63	?	853	42	28	524	?	?	4,242
2	11	42	2	1	13	2	—	219	17	85	347	8	7	150	61	10	1,993
4	?	114	5	2	65	?	?	590	80	?	1,200	50	35	674	?	?	6,235

* S. Note auf p. 276.

TABELLE NO. 2.—EINFLUSS DES ALTERS DES VATERS A
ALTE

ALTER DER VÄTER.		MIT M							
		Bis 18 Jahre.							
		Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	und trophie Inanitio.	Frühgeboren.
Unter 18 Jahren.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	?
18—19.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	?
19—20.	1878-82	—	?	—	—	—	1	?	?
	1888-89	—	1	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	1	?	?
20—25.	1878-82	—	?	5	—	—	9	?	?
	1888-89	—	2	1	—	—	—	—	—
Zusammen	—	—	?	6	—	—	9	?	?
25—30.	1878-82	—	?	4	—	1	7	?	?
	1888-89	—	2	9	—	—	3	—	2
Zusammen	—	—	?	13	—	1	10	?	?
30—40.	1878-82	—	?	1	1	1	5	?	?
	1888-89	—	—	1	—	—	—	—	—
Zusammen	—	—	?	2	1	1	5	?	?
40—50.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	?
Ueber 50 Jahre.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen	—	—	?	—	—	—	—	?	?
—	1878-82	—	?	10	1	1	22	?	?
	1888-89	—	5	11	—	—	3	—	2
Total-Summe	—	—	?	21	1	1	25	?	?

* S. Note auf p. 276.

TODESURSACHE DER KINDER; IN COMBINATION MIT DEM MUTTER.

IM ALTER VON	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10J.*
18—30.									
	—	?	1	—	—	1	?	?	4
	—	—	—	—	—	—	—	—	—
	—	?	1	—	—	1	?	?	4
	—	?	—	—	—	—	?	?	2
	—	—	—	—	—	1	—	—	1
	—	?	—	—	—	1	?	?	3
	—	?	4	1	—	1	?	?	22
	—	—	1	—	—	—	—	—	1
	—	?	5	1	—	1	?	?	23
	10	?	117	5	5	65	?	?	564
	3	10	42	4	—	17	13	4	225
	13	?	159	9	5	82	?	?	789
	47	?	730	26	27	445	?	?	3,586
	12	84	449	24	13	160	66	5	1,677
	59	?	1,179	50	40	605	?	?	5,263
	117	?	1,204	54	48	722	?	?	6,734
	18	94	612	29	17	226	114	13	2,524
	135	?	1,816	83	65	948	?	?	9,258
	7	?	105	9	9	126	?	?	631
	15	17	38	1	6	14	11	—	208
	22	?	143	10	15	140	?	?	839
	2	?	12	3	—	10	?	?	97
	2	—	7	—	—	—	1	2	28
	4	?	19	3	—	10	?	?	125
	183	?	2,173	98	89	1,370	?	?	11,640
	50	205	1,149	58	36	418	205	24	4,664
	233	?	3,322	156	125	1,788	?	?	16,304
30—40.									
	—	?	—	—	—	—	?	?	—
	—	—	—	—	—	—	—	—	—
	—	?	—	—	—	—	?	?	—
	—	?	—	—	—	—	?	?	5
	—	—	—	—	—	—	—	—	1
	—	?	—	—	—	—	?	?	6
	—	?	—	—	—	1	?	?	3
	—	—	—	—	—	—	—	—	—
	—	?	—	—	—	1	?	?	3
	—	?	3	—	—	6	?	?	23
	—	1	—	1	—	1	—	—	8
	—	?	3	1	—	7	?	?	31
	4	?	44	—	2	34	?	?	287
	3	4	43	1	—	13	8	—	189
	7	?	87	1	2	47	?	?	476
	76	?	1,007	31	33	578	?	?	5,361
	32	71	528	15	7	162	96	15	2,144
	108	?	1,535	46	40	740	?	?	7,505
	38	?	627	14	15	334	?	?	2,791
	8	28	199	3	27	92	45	2	900
	46	?	826	17	42	426	?	?	3,691
	3	?	51	3	1	26	?	?	305
	2	3	30	1	—	10	1	—	109
	5	?	81	4	1	36	?	?	414
	121	?	1,732	48	51	979	?	?	8,775
	45	107	800	21	34	278	150	17	3,351
	166	?	2,532	69	85	1,257	?	?	12,126

* S. Note auf p. 276.

TABELLE No. 2.—EINFLUSS DES ALTERS DES VAT

ALTER DER VÄTER.	—	MIT MI							
		Über 40.							
		Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.
Unter 18 Jahren.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
18—19.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
19—20.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
20—25.	1878-82	—	?	1	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	1	—	—	—	?	?
25—30.	1878-82	—	?	2	—	—	1	?	?
	1888-89	—	—	2	—	—	—	—	—
Zusammen -	—	—	?	4	—	—	1	?	?
30—40.	1878-82	3	?	32	1	2	10	?	?
	1888-89	—	6	16	—	1	5	2	2
Zusammen -	—	3	?	48	1	3	15	?	?
40—50.	1878-82	9	?	119	9	3	84	?	?
	1888-89	2	34	34	1	2	24	13	2
Zusammen -	—	11	?	153	10	5	108	?	?
Ueber 50 Jahre.	1878-82	2	?	25	1	1	24	?	?
	1888-89	1	2	20	—	—	2	—	—
Zusammen -	—	3	?	45	1	1	26	?	?
	1878-82	14	?	170	11	6	119	?	?
	1888-89	3	42	72	1	3	31	15	4
Total-Summe -	—	17	?	251	12	9	150	?	?

* S. Note auf p. 276.

AUF DIE TODESURSACHE DER KINDER—*Fortsetzung.*

IM ALTER VON:	Zusammen.							
	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10j.*
	—	?	1	—	—	1	?	?	4
	—	—	—	—	—	—	—	—	—
	—	?	1	—	—	1	?	?	4
	—	?	—	—	—	—	?	?	8
	—	—	—	—	—	1	—	—	2
	—	?	—	—	—	1	?	?	10
	—	?	4	1	—	3	?	?	28
	—	1	1	—	—	—	—	—	2
	—	?	5	1	—	3	?	?	30
	10	?	126	5	5	80	?	?	621
	3	13	43	5	—	18	13	4	241
	13	?	169	10	5	98	?	?	862
	51	?	780	26	30	487	?	?	3,928
	15	90	503	25	13	176	74		1,899
	66	?	1,283	51	43	663	?	?	5,827
	196	?	2,344	87	83	1,315	?	?	12,256
	50	171	1,157	44	25	393	212	30	4,727
	246	?	3,401	131	108	1,708	?	?	16,983
	54	?	851	32	27	544	?	?	4,003
	25	79	271	5	35	130	69	4	1,314
	79	?	1,122	37	62	674	?	?	5,317
	7	?	88	7	2	60	?	?	579
	5	5	57	1	—	12	2	2	207
	12	?	145	8	2	72	?	?	786
	318	?	4,094	158	147	490	?	?	21,427
	98	359	2,032	80	73	730	370	47	8,392
	416	?	6,126	238	220	3,220	?	?	29,819

* 8. Note auf p. 276.

Anhang zu Tabelle No. 2.—Specif

Alter der Väter.	—	Bis 18 Jahre.							
		Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.
50—55.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
55—57.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
57—59.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
59—61.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
61—63.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
63—65.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
Ueber **65** Jahre.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
Ueber **50** Jahre.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?

* S. Note auf p. 276.

des Alters der über 50jährigen Väter.

18—30.									30—40.								
Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10j.*	Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10j.*
1	?	6	1	—	4	?	?	52	2	?	42	1	1	16	?	?	222
2	—	4	—	—	—	1	—	21	2	3	27	1	—	6	1	—	84
3	?	10	1	—	4	?	?	73	4	?	69	2	1	22	?	?	306
—	?	1	—	—	—	?	?	14	—	?	3	—	—	4	?	?	36
—	—	1	—	—	—	—	—	1	—	—	—	—	—	3	—	—	11
—	?	2	—	—	—	?	?	15	—	?	3	—	—	7	?	?	47
—	?	1	1	—	1	?	?	10	—	?	1	2	—	3	?	?	20
—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	3
—	?	1	1	—	1	?	?	10	—	?	2	2	—	4	?	?	23
1	?	1	—	—	2	?	?	7	1	?	1	—	—	1	?	?	10
—	—	1	—	—	—	—	—	1	—	—	2	—	—	—	—	—	5
1	?	2	—	—	2	?	?	8	1	?	3	—	—	1	?	?	15
—	?	—	—	—	1	?	?	3	—	?	2	—	—	1	?	?	4
—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	3
—	?	—	—	—	1	?	?	4	—	?	2	—	—	1	?	?	7
—	?	1	1	—	1	?	?	6	—	?	—	—	—	—	?	?	3
—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
—	?	1	1	—	1	?	?	7	—	?	—	—	—	—	?	?	4
—	?	2	—	—	1	?	?	5	—	?	2	—	—	1	?	?	10
—	—	1	—	—	—	—	2	3	—	—	—	—	—	—	—	—	2
—	?	3	—	—	1	?	?	8	—	?	2	—	—	1	?	?	12
2	?	12	3	—	10	?	?	97	3	?	51	3	1	26	?	?	305
2	—	7	—	—	—	1	2	28	2	3	30	1	—	10	1	—	109
4	?	19	3	—	10	?	?	125	5	?	81	4	1	36	?	?	414

* S. Note auf p. 276.

Anhang zu Tabelle No. 2.—Specifi

Alter der Väter.		Über 40.							
		Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.
50—55.	1878-82	2	?	17	1	—	16	?	?
	1888-89	1	2	12	—	—	—	—	—
Zusammen -	—	3	?	29	1	—	16	?	?
55—57.	1878-82	—	?	4	—	1	2	?	?
	1888-89	—	—	4	—	—	2	—	—
Zusammen -	—	—	?	8	—	1	4	?	?
57—59.	1878-82	—	?	2	—	—	2	?	?
	1888-89	—	—	2	—	—	—	—	—
Zusammen -	—	—	?	4	—	—	2	?	?
59—61.	1878-82	—	?	2	—	—	2	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	2	—	—	2	?	?
61—63.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	1	—	—	—	—	—
Zusammen -	—	—	?	1	—	—	—	?	?
63—65.	1878-82	—	?	—	—	—	2	?	?
	1888-89	—	—	1	—	—	—	—	—
Zusammen -	—	—	?	1	—	—	2	?	?
Ueber **65** Jahre.	1878-82	—	?	—	—	—	—	?	?
	1888-89	—	—	—	—	—	—	—	—
Zusammen -	—	—	?	—	—	—	—	?	?
Ueber **50** Jahre.	1878-82	2	?	25	1	1	24	?	?
	1888-89	1	2	20	—	—	2	—	—
Zusammen -	—	3	?	45	1	1	26	?	?

* S. Note auf p. 276.

Alters der über 50jährigen Väter—Fortsetzung.

Zusammen.								
Hydrocephalus.	Lungentuberculosis.	Darmkatarrh.	Rachitis.	Scrophulosis.	Angeborne Lebensschwäche.	Atrophie und Inanitio.	Frühgeboren.	Gesammtzahl der Verstorbenen. 0—10J.*
5	?	65	3	1	36	?	?	397
5	5	43	1	—	6	2	—	158
10	?	108	4	1	42	?	?	555
—	?	8	—	1	6	?	?	70
—	—	5	—	—	5	—	—	25
—	?	13	—	1	11	?	?	95
—	?	4	3	—	6	?	?	44
—	—	3	—	—	1	—	—	4
—	?	7	3	—	7	?	?	48
2	?	4	—	—	5	?	?	27
—	—	3	—	—	—	—	—	6
2	?	7	—	—	5	?	?	33
—	?	2	—	—	2	?	?	12
—	—	1	—	—	—	—	—	5
—		3	—	—	2	?	?	17
—	?	1	1	—	3	?	?	13
—	—	1	—	—	—	—	—	3
—	?	2	1	—	3	?	?	16
—	?	4	—	—	2	?	?	16
—	—	1	—	—	—	—	2	6
—	?	5	—	—	2	?	?	22
7		88	7	2				579
5	5	57	1	—	12	2	2	207
12	?	145	8	2		?	?	786

* S. Note auf p. 276.

DISCUSSION.

Dr. Singer (Munich), thought that the variations of mortality of the child in relation to age of mother, as shown by M. Körösi, might be in immediate connexion with the fact shown by Westergaard, that marriages take place at comparatively early age amongst the labouring classes and at a more advanced age amongst those of better social position.

Dr. Leffingwell called attention to the curious fact that during the last 50 years in England, the proportion of boys born had slowly decreased. When the first observations were made half a century ago, the proportion of boys to girls was about as 105 to 100; 20 years later it was about 104 to 100, and it now averages less than 104, and seems approaching 103. This phenomenon is coincident to some extent with the fall in the marriage rate; and it would be interesting to know if the same sociological phenomenon is occurring in other parts of Europe.

The President was not aware that this interesting question had ever been discussed in England before on an adequate statistical basis except so far as the work of Dr. Matthews Duncan covered the same ground. That gentleman found that the vitality of the children at the maternity hospital was greater when the mother was of about 24 years of age. It would be desirable if M. Körösi could assure us that there was no great difference in the general social position of those classes in Budapest who made early marriages and of those who made late ones. It seemed to him that a very good way of throwing light upon the subject of the paper would be to investigate carefully the records of stud books whether of highly bred horses, cattle, or dogs. It would be comparatively easy to ascertain in these cases what the effect was of mating animals of different ages. All the necessary facts already exist in print for a conclusive investigation in these cases.

Dr. G. B. Longstaff stated that another series of observations were required which should properly precede those of M. Körösi.

In order to work out mathematically the exact direct influence of fluctuations in the marriage rate upon the birth-rate it was essential to know for each country and for the various social classes the normal birth-rate in each successive year after marriage, distinguishing children born alive. The births in each year were due to marriages in many preceding years, and we did not know how many resulted from marriages that had taken place in the immediately preceding year.

He hoped that M. Körösi would continue his most interesting researches.

Sir R. Rawson considered that M. Körösi's paper was one of the most valuable and suggestive that had been brought before this Division and, combined with the proposals of Dr. Longstaff and others, it presented a subject that might be taken up with great advantage by the International Statistical Institute.

Dr. Körösi in reply, said:—It has been suggested to include also positive figures, to which I reply that these figures will be found in a table to be annexed to the paper. Then, it has been asked if there is no influence exerted by social position; and if no change in fertility attends difference in the ages of the parents and in relation to the first year of marriage. I can answer these three questions at once, but must first refer to the reform I introduced in the statistics of natality of Budapest. Demography being divided into two parts, natality and mortality, it is

noticeable that, whilst the second part has been developed to a very high degree—and we have the opportunity of greeting in this room some of the most prominent men of this statistical department—the second part is so much neglected, that it is now nearly everywhere in the same state as at the time of Graunt and Sussmitch. I looked at the birth statistics of European States, and found but three headings—legitimate, still-births, and the multiple births. As for fertility, we do not know even what is the number of children born in a marriage. I have now succeeded in obtaining a byelaw in Budapest, which compels each midwife to fill in a card for each legitimate birth; these cards are collected by the clergymen who keep the register, and are then sent to the municipal bureau of statistics. On this card there is quite a large number of questions as to social rank, duration of marriage, how many children born before, how many of them males, &c. You see that in this way a long series of questions can be answered, whilst previously we got only a poor table embracing but three or four points of view. Allow me to add that, besides these bulletins of births we now possess a still more valuable source of statistics in the last census. There I inserted for Budapest questions on fertility, that is, how many children born? how many alive? how long married? and now these facts can be combined with all the wide observations of the census on occupation, religious belief, age of the father, age of the mother, &c. In this way we shall be able to work out two quite different things:—(1.) *Tables of natality.* The tables of mortality show the probability of equi-aged people dying in the course of a year. The table of natality ought similarly to show what is the probability for equi-aged couples having a child in the course of a year. The table of mortality comprises nearly 100 elements (years of age); but as we have to deal in natality with the ages of two persons, the number of elements rises to 1,200. (2.) *Table of fertility*, to show how many children have been born in the course of the life of equi-aged couples, and how many are alive after different durations of marriage. These tables are very complicated, as I shall have the honour to report to the next meeting of the Statistical Institute. I may mention that these tables of fertility will be produced in the following manner: one table of fertility for the whole population, three tables for three professions, three for three classes of wealth, and 17 for 17 occupations. These tabulations are now in full work, and I hope to be enabled to present this year to the meeting of the International Institute tables on the fertility of the professions, and of these classes of wealth.

Friday, 14th August 1891.

The Chair was successively occupied by
F. J. MOUAT, M.D., LL.D., F.R.C.S.,
and
The President, FRANCIS GALTON, Esq., F.R.S.

Personal Identity determined by Scars and other Body Marks.

BY

Lieut.-Colonel CHAS. R. GREENLEAF and Major CHARLES SMART
Medical Department, U.S. Army.

In time of peace desertion from the Army of the United States ha been a serious evil. This is believed to be true of other regular force raised by voluntary enlistment. The best observers, confident tha charges of military mismanagement in relation to the comfort an well-being of the soldier were groundless so far as the army i question is concerned, referred much of the desertion to the restles ness of the men, their failure to recognise the binding nature of the contract, the ease with which the offence is committed, and the grea probability that detection would be avoided. Further, many officers among them the writers, believed that the actual deserters and th desertions did not correspond in number, but that many of these me again enlisted and again deserted when the temporary pressure for sul sistence relaxed or they tired of their new station. These new enlist ments were easily accomplished in the absence of means to identify th repeaters, the chance of recognition, or, if suspected, of being reporte by a comrade, being very small.

Assuming this to be the case, if a certain method were devised b which every deserter could be detected on again enlisting, not onl would this objectionable element be eliminated from the ranks, but th criminals themselves would be held for punishment. This would no abolish desertion, but it would do away with repeating, whatever it proportions, which were thought to be great, might be.

To do this it was manifestly necessary to clearly identify ever accepted recruit, to classify him when leaving the service dishonourabl or under circumstances forbidding his re-entry, and to detect him whe fraudulently enlisting again.

Bertillon's anthropometric method, that was enthusiastically receive by many prison officers, was carefully examined for this purpose soo after its introduction into the United States two or three years ago. I seems an excellent index to a large number of individualities that ma

be subdivided into smaller sections with which the individual records may be compared; but it is trustworthy only so far as the measurements are accurate.

Now, since the measurements of the height of recruits as recorded by our examining officers showed us that in following the record of an individual we should have to pursue three trails, the recorded height and two others—one a half-inch above and the other a half-inch below the recorded height—we found that, in adopting the Bertillon system, to trace a single individual we must pursue twenty or thirty trails, as there are seven or more measurements to be made, and each, according to our knowledge of the work of our medical and recruiting officers, would require three branches of investigation if the subject were to be carefully followed up. Moreover, granted that our officers should become as enthusiastic anthropometricians as some of our prison superintendents, and that their measurements should be accepted as within the limits of allowable error, their statements of the measurements would give no guarantee of the identity of the individual to the officers of a court-martial. These officers would individually have no difficulty in recognising identity if the reputed individuals were each of the same height, colour of eyes, apparent age and nationality, and had each a brown mole over the xiphoid cartilage, an oblique scar half an inch long across the back of the interphalangeal joint of the left thumb, the lobe of the left ear chopped off, and the letters X, Y, Z, with certain other specified flourishes tattooed on his right forearm. They would recognise these personal marks, and condemn; but it is a question whethey they would be scientific enough to condemn on the coincidence of measurements which have allowable limits of error, and some of which may, as is well known, be modified by the effort of the subject at deception.

The system of Bertillon takes cognizance of these personal marks and scars as COLLATERAL EVIDENCE; but to us this collateral evidence appeared to be the primary evidence that would prove or disprove the case; and as we considered that the men whom we desired to detect were not such as would be likely to have lived their lives without incurring scars, we believed that a careful record of these personal marks would suffice to determine identity without the various measurements of the anthropometric system. The accuracy of our conclusions will be shown directly.

That which was needful was evidently a full and precise record of the permanent marks on the body of every man in the army. We planned an outline figure card on which such marks should be recorded. One side of the card gave in outline a view of the anterior surface of the body, the other gave the posterior surface; both were divided by dotted lines into regions, so that the situation, size, obliquity, etc., of a mark or scar could be seen at a glance, independent of any detailed description. In connexion with this figure card we devised a system which in theory was as follows: Let our file-boxes contain a card for

every enlisted man of the army, showing on it every permanent mar
scar, or peculiarity of the individual at the time of his enlistmen
These cards would represent the army, not as organised into corps an
regiments, but arranged alphabetically for convenience of referenc
Let us have also every change in the personnel of the army promptl
reported and noted, so that our file-boxes of cards should always represe
its actual condition by the addition of the cards of recruits and th
withdrawal of those discharged, died, deserted, etc. In time we shoul
accumulate a large number of cards of men who had deserted or bee
discharged for disability or misconduct; and our object would then b
to prevent the enlistment of any man who had a dishonourable recor
Each morning's mail would bring us the changes that had taken plac
So many notifications of discharge, desertion, etc., and so many cards
newly-enlisted men. The office work would resolve itself into notin
the losses by desertion, etc., and comparing the cards of the recruits wit
those of deserters and others of bad record to ensure that these me
should not again effect an entrance into the army.

Obviously the best method of instituting a system of this kin
would have been to call for the card of every man in the army, of recrui
as enlisted, and for the notification of losses day by day as they occurred
but as superior authority did not have confidence in our ability to effe
any practical good by this project, we did not feel authorized to ask f
all that we desired, but determined to do the best we could with th
means available.

Accordingly as a beginning on April 1st, 1889, the outline figu
card was called for from every medical or other officer concerned i
recruiting, and the following instructions were issued:—

> II. Hereafter, a record of such indelible or permanent marks
> may be found upon the person of an accepted recruit wi
> be made upon an outline figure card, as illustrated o
> accompanying pages of this order, and forwarded prompt
> on completion to the Surgeon General of the Army. N
> letter of transmittal is required. The outline cards will b
> furnished by the Adjutant General.
>
> The examination and record of marks of recruits belonging to th
> General Service will be made by the medical officer at
> depôt; of recruits enlisted at military posts, by the post
> attending surgeon; and of recruits enlisted at other plac
> where the services of a post or attending surgeon cannot b
> obtained, by the enlisting officer. In the cases referred to i
> Section I., the record of marks will be made at the secon
> examination.
>
> The object of this record is to obtain evidence for the identificatio
> of men who have had previous service in the army, and i
> successful accomplishment depends upon a rigorous precisio
> in noting on the card all personal markings or peculiaritie
> The following directions should therefore be strictl
> observed:—

DIRECTIONS FOR RECORDING THE PERSONAL MARKINGS ON ACCEPTED RECRUITS.

Make a careful search of the body, front and rear, on each side of the median line, separately, commencing at the scalp and ending at the foot, for any scars, moles, tattoo marks, &c., that may exist, indicating their position on the body by a dot, made with pen and ink, at a corresponding point on the figure card; on its blank fly-leaf note the *general inclination*, whether vertical, oblique, or horizontal; the *form*, rectilineal, curved (inward or outward), oval, circular, undulated, or oblong; the *character*, if scar, whether recent, permanent, or transient; if mole, hairy or otherwise, &c.; and the distance of the mark from some fixed anatomical point, for example: "Scar, from burn, 1¾ inches above and "1 inch to the right of left nipple, oblique, curved inwards."

When numerous small scars are found on the back, from pimples, or on the fingers from cuts, note them as "numerous scars," or describe the principal one and add the words "and many others;" describe briefly tattoo marks and distortions of the finger and toe nails, *i.e.*, the striated or split nail of the finger, or the hypertrophied nail of the great toe.

If, after careful search, no personal marking is found, the fact should be noted on the figure card.

When about 3,000 cards had been collected they were carefully studied with the view to determine the best method of comparing one card with the others for the purpose of detecting identity. The first practical result of this study was to show carelessness by many examining officers, as manifested by a large number of cards indicating no marks whatever on the individual. This was corrected at first by returning the cards for some physical characteristic that would distinguish one man from another of the same height and colour of eyes; and later, when it was found that careful officers averaged 17 permanent marks to a card, by informing those who reported none that the presumption in view of the large general record was that of negligence and asking for a special examination and greater care. Very soon there was a manifest improvement in the cards received, and their value for the purpose in view was correspondingly increased.

Analysis of these 3,000 cards showed that they could be divided into sections for comparison in accordance with height, colour of eyes, and the regions on which the scars were noted. Dividing the men into tall men of over 68 inches, small men of under 66 inches, and men of medium height, we had three grand divisions which became split into six, according as the iris was brown in colour, or of some shade of blue or grey. We consolidated the blue and grey eyes on account of the uncertainty of the record in many instances. We had thus six primary divisions dependent on height and colour of eyes, to be broken up into smaller sections by the body marks and scars. Presuming that a scar on the face would be observed and noted, no matter what marks or scars there might be on other parts of the body, this constituted the first

every en
scar, or
These ca
regimen
Let us h
reported
its actu
withdraw
accumula
discharg
to preven
Each mo
So many
newly-enl
the losses
those of
should no

Obvi
would hav
as enlisted,
but as supe
any practic
all that w
means avail

Accord
card was
recruiting,
II. Her

The exam

The object
of
suc
in
Th
obs

ard of a man who had no marks
at section, but if he had a scar
wrist, of the anterior surface
compared with those of the de
had no scar on the face but w
forearm, or arm. Scars or marks
prevalence of those on the po
the cards into smaller packe
the card of a recruit 69 incl
wounded scar the cicatrix of
or among those of medium or
nor among the tall men
marks on the face or other an
those having marks on the pos
this kind our 3,000 cards cou
containing not more than 50 cards.
the cards speedily demonst
theory, was by no means so
in question and its compa
the tattoos, marks, and sca
register consists of two volumes,
brown-eyed men, and is div
inches and under, $64\frac{1}{2}$, 65, $65\frac{1}{2}$,
71, $71\frac{1}{2}$ and over. Each regi
regions of the body as, Anter
general divisions, with head, ne
thigh, knee, leg, ankle, foot, t
division of height is again divid
from those having no tatto
to have the same when
men *without* tattoos is not lik
It will be observed, howev
examined over those desert
leaves might have been put

descriptions of deserters a
S, scar; T, tattoo; B, birt
P, chicken pox, etc.
register, an inch on each side o
or defective measurement.
has been said, in obtainin
and a similar difficulty was en
desertions, so that, althoug
April 1, 1889, it was really no
1890 that the system was in
results to May 31st last are as
men have been recognized
fraudulent enlistments, having
a total of 59 detections by
62 cases, and it is to be

observed that in this number of cases only one mistake has been made. This was where identity was suspected and reported on height, colour of eyes, und the loss of a portion of his ear; but the identity was disproved by other circumstances not at the time of the report known to this office. The two others cases were successes so far as the system is concerned, for one was a military convict, whose re-enlistment had been authorised, and the other a case of an unsuccessful applicant for enlistment whose card, forwarded by mistake, was compared and identified as that of a recently released convict.

Upon the results of this experiment, 62 cases with but one mistake in so short a time after the inauguration of the system under many official difficulties, we claim that the body marks, if carefully noted, suffice to determine identity wholly irrespective of the special measurements on which the Bertillon system is based.

Appended are a few of the cards by which identity was established, and the plan of the register of desertion.*

APPENDIX.

Interesting Cases of Identity ascertained by means of Outline-cards.

Charles Gross enlisted at San Antonio July 3, 1889, and deserted October 4, 1890. His outline-card showed but two distinguishing marks, viz., a mole on left side of chest, and a mole at edge of right nipple. February 25, 1891, he was enlisted at Jackson Barracks under the name of Franz Ross, and his outline-card was duly received, showing altogether nine moles and warts, including the two reported on the Gross card. By the aid of these two his identity was discovered and reported to A.G.O. The man when accused of being Charles Gross admitted his identity, and at last information was in confinement awaiting trial. Copy of cards herewith.

David L. Crosson re-enlisted at Columbus Barracks April 8, 1890, and deserted August 9, 1890. He was again enlisted March 16, 1891, at Dayton, Ohio, under the name of Samuel Schooley, and was identified by a mole on right buttock and the loss of a part of left little finger. When accused of being Crosson he admitted his identity, upon trial pleaded guilty, and was sentenced to 18 months in Leavenworth Prison. In this case there was a discrepancy of three-fourths of an inch in height. Copies of cards herewith.

John W. Hull enlisted at Fort Hancock January 1, 1890, and deserted May 8, 1890. His outline-card was duly received, and showed a mole under right eye, and a very common tattoo (a five-point star) on right front fore-arm. He was enlisted again at Jackson Barracks December 16, 1890, under the name of John W. Butler, his card showing 13 scars and moles, including that under eye, and the tattooed star on right front fore-arm. By means of the mole under eye and the tattoo his identity was recognised and reported to A.G.O. When accused thereof he acknowledged it, was held for trial, and while so held escaped from guard-house February 9, 1891. There is a discrepancy of seven-eighths of an inch in height. Copies of cards herewith.

* A large number of cards and other documents were exhibited to the Section in illustration of this paper.

MICHAEL JONES was released from prison at Alcatraz Island May 15, 1890. He is a man 71 inches in height, and had at release a large number of tattoo marks on his chest and arms. He was enlisted at Fort Douglas July 26, 1890, under the name of William Brady, his outline-card duly compared with prison cards, the man recognised, and identity reported to A.G.O. Upon questioning by the post surgeon, Brady admitted that he was ex-convict Jones, and his discharge was ordered for false pretences per S.O. 219., A.G.O., 1890. Pending the receipt of this order at the post Brady deserted September 1, 1890, and the order was revoked. December 22, 1890, he was enlisted at Fort Monroe under the name of Michael A. Jones, at the time of enlistment denying prior service. His card, however, revealed his identity, which was duly reported. Upon being charged therewith he admitted he was ex-convict Jones, but denied that he had ever enlisted at Fort Douglas as William Brady. At the suggestion of the Surgeon-General he was photographed and the photographs sent to Fort Douglas, where he was recognized as deserter Brady. It is understood that this fact was withheld from him until trial, he meanwhile persisting in his denial that he was Brady, and pleading that he was not the man when brought to trial. At trial he was confronted with the necessary witnesses, was found guilty, and sentenced to three years at Leavenworth Prison. Copies of cards herewith.

JOHN C. SULLIVAN enlisted at New York August 5, 1889, and deserted April 15, 1890. His outline-card showed a large number of tattoos on arms and hands. March 2, 1891, he again enlisted at Fort Hamilton as James Smith, his cards showing the tattoos substantially as before. By means of them his identity was recognized and reported to the A.G.O. On trial he admitted his identity, and was sentenced to two years at Leavenworth. Copies of cards herewith.

TABLE of RECRUITS IDENTIFIED by means of OUTLINE CARDS to May 31, 1891.

Number reported to A.G.O.				Results.			
—	1890.	1891.	Total.	—	1890.	1891.	Total.
As deserters	11	15	26	Escaped (by desertion) :—			
				Before apprehension	2	1	3
				After apprehension and confession.	1	1	2
				Pending correspondence	1	—	1
				Sentenced	6	4	10
				Confined awaiting trial	—	3	3
				Discharged without character	1	—	1
				Records connected in A.G.O.*	—	4	4
				Pending	—	2	2
				Total deserters	11	15	26
As ex-convicts	7	14	21	Deserted pending discharge†	1	—	1
				Discharged for false pretences	6	9	15
				Records connected in A.G.O.*	—	3	3
				Pending	—	2	2
				Total convicts	7	14	21
As other frauds	—	12	12	Discharged for false pretences	—	8	8
				Retained in service	—	1	1
				Pending	—	3	3
				Total other frauds	—	12	12
Grand total	18	41	‡59		18	41	59

* The identity of these recruits was not ascertained until they had got out of service by desertion or otherwise.

† This man afterwards again enlisted, was again identified, duly reported a deserter, found guilty, and sentenced to three years in Leavenworth Prison.

‡ Of these, 2 deserters, 9 convicts, and 10 frauds re-enlisted under same name.

COPY of LETTERS returning unsatisfactory OUTLINE-CARDS, and directing a RE-EXAMINATION of the RECRUIT.

1. *When no moles and scars are shown.*

The enclosed outline-card of is respectfully returned with request that the man be again examined to ascertain whether he may or may not have moles and scars that have escaped observation and record. Cards received from recruiting depôts invariably show such marks, in addition to vaccinations and tattoos, often in great number, and seldom fewer than five. Of 130 cards noted from all depôts, but one shows less than five; of 25 Columbus Barracks cards taken at random, but one shows less than 12, and the average is over 17; of 25 later cards from the same depôt, but one shows less than 13, and the average is 22. It is believed that the rigorous examination contemplated by G.O. No. 33, of 1889, will almost without exception disclose at least five moles and scars, and it may be added that the work of identification for which the cards are designed cannot be reliably and satisfactorily accomplished with less.

2. *When but two or three scars and moles appear, or when no marks are shown except vaccinations and tattoos.*

The enclosed outline-card of is respectfully returned with request that the man be again examined to ascertain whether he may not have additional moles and scars that have escaped observation and record. Cards received from recruiting depôts seldom show fewer than five such marks in addition to vaccinations and tattoos. Of a total of 130 cards noted from all depôts, etc. (as above).

Finger-prints and their Registration as a Means of Personal Identification.*

BY

FRANCIS GALTON, F.R.S.

MR. GALTON demonstrated his method of identification by means of finger prints, and explained the degree of facility by which it is possible to determine whether the duplicate of a submitted set of impressions is or is not contained in a catalogued collection of the finger prints of different persons, say of criminals.

The prints used are those of the bulbs of the ten digits, in each of which a pattern is to be found that is usually isolated by one or two pairs of divergent papillary ridges. The varieties of these patterns, and the method of their formation were described by him in the Phil. Trans. Royal Society, 1891, where evidence was also given of the persistence, throughout life, in the minutest details of the ridges by which they are

* Abstract of remarks accompanying demonstration by the Author.

formed. The patterns grow in size with the individual, and in their proportions they somewhat vary at different periods of life according to the fatness or leanness, &c. of the finger, but their general character, on the one hand, and their structure in all its minuteness on the other, remain unchanged.

The method of identification proposed by him was described in a second memoir read more recently before the Royal Society, and about to be published in its proceedings.

The method consists of two stages; the first is classification according to the general character of the pattern, the second is the scrutiny of all the specimens that are contained in the same class by attending to one or more of the minutiæ.

For classification, the method is adopted of regarding only the most obvious differences of character in each of the ten fingers; these are whether the pattern in each of them ranks as a "Primary," a "Whorl," or as a "Loop." No other heads are recognised; the few doubtful cases being classed under one or other of these three heads according to a collection of standard specimens. Every one of these classes is, however, liable to a two-fold sub-division; being numbered with an even number* whenever the pattern is not symmetrical, and its slope lies from the finger tip downwards towards the *radial*, and not the cubital side of the hand. Thus a primary may be numbered 1 or 2, a whorl 3 or 4, or loop 5 or 6. These are the only numbers used. The numerical token of any hand is registered in a form like this; 153, 263, 35, 55, in which the first triplet of numerals refer to the first, second and third fingers successively of the left hand, the second triplet to the first, second, and third of the right hand, the first couplet of numerals to the thumb and little finger of the left hand, the second couplet to the thumb and little finger of the right hand.

The different sequences occur with widely different frequency.

An analysis of the prints from 100 persons taken at random, showed that there were 71 cases of the same sequence occurring only once, 10 cases of the same sequence occurring twice, one case of a sequence occuring three times, and one case (that of all being plain loops) of a sequence occurring six times Consequently—

$$[71\times1+10\times2+1\times3+1\times6=100.]$$

A pattern is rapidly read off into numbers, whether it be read in a print or on the hand itself, and the case is quickly allotted to its appropriate pigeon hole. The number-token of a pair of hands suffices by itself for a large amount of negative identifications on the one hand, and of positive suspicion on the other.

The scrutiny of the individual prints that may be contained in any particular pigeon hole is conducted rapidly by fixing on some one well marked minute characteristic in any one finger in the specimen submitted

* During the year that has elapsed since these remarks were written, I have made considerable progress in the art of classification, and now use *letters* instead of numerals, as explained in my just published book on *Finger-Prints* (Macmillan & Co.)—F. G., October 1892.

for identification, and confining the attention to that alone. The prints are brought in rapid succession under a low-power lens (say six-inch focus), and are examined for this characteristic.

In the print of each finger bulb there are on the average at least 30 distinct points of reference, so that a degree of certainty in identification, far exceeding that by any other method, can rapidly be obtained.

Demonstrations were made with a classified set of prints from 300 different persons.

It was announced that an account of the method, with illustrations which are necessary for its adequate explanation, would be subsequently published.

Résultats statistiques de l'Anthropometrie appliquée a l'Identification des Personnes.

PAR

le Dr. Jacques Bertillon et le Dr. Alphonse Bertillon, Paris.

Beaucoup de particularités anatomiques, analogues à celles qu'ils préconisent, ont été proposées pour définir l'identité individuelle. Toutes pèchent par le même défaut : *c'est qu'il est impossible de les classer.*

La supériorité du système d'identification inventé par M. Alphonse Bertillon, frère de l'orateur, c'est qu'il permet un classement rapide, sûr, et tellement simple qu'on peut y être initié en quelques minutes.

Les particularités anatomiques qu'on a proposées pour définir l'identité sont innombrables, parce que toutes les fois qu'on étudie soigneusement une partie quelconque du corps, on s'aperçoit bientôt que sa conformation varie extrêmement d'un individu à un autre. Aussi des dentistes ont-ils conseillé à M. Alphonse Bertillon de faire mordre les individus dont on veut déterminer l'identité, dans un morceau de cire ; ils affirment qu'il n'existe pas au monde deux individus, ayant la même denture. Fort bien ! Mais si vous avez cent mille empreintes de dents, comment les classerez-vous ? Quel motif aurez-vous de mettre ma denture à moi avant celle de mon voisin de droite en après celle de mon voisin de gauche ? Vous n'en avez aucun ! Des lors, lorsqu'un individu aura mordu dans ce morceau de cire, comment irez-vous rechercher dans votre collection si vous avez déjà une denture pareille ? Vous ne pourrez faire cette recherche. Donc ce mode d'identification est impraticable.

Même objection doit être opposée aux craniologistes qui conseillaient de dessiner le pourtour du crâne, affirmant que jamais deux hommes n'ont un pourtour de crâne identique. Il n'y a pas moyen de classer de tels documents. Donc ils ne peuvent pas servir.

Même objection pour ceux qui veulent utiliser de même le dessin de l'oreille, etc., etc.

Il y a une région du corps que tout le monde étudie constamment et qui varie beaucoup avec les individus; c'est la face. Il est très simple de la photographie; et ce serait un moyen recognitif assez bon si on pouvait classer les photographies. Mais on ne le peut pas. Il n'y a aucune raison pour mettre ma photographie avant ou après celle de mon voisin. Donc la photographie ne pourra être retrouvée quand on la cherchera, et le moyen ne vaut rien.

Cette même objection, à savoir l'impossibilité du classement, M. Bertillon l'oppose à la méthode d'identification proposée par M. Galton. Cet habile auteur, il est vrai, est parvenu à inventer un système de notation numérique très ingénieux pour décrire les empreintes digatiles. Mais cette notation n'est pas à la portée de tout le monde, et enfin, lorsqu'on consulte les registres de M. Galton, on voit que beaucoup d'empreintes ont donné lieu à la même notation numérique: 5 c.c., 5 c., 5 c. Dans ce cas, c'est l'étude très soignée des détails de l'empreinte qui peut seule distinguer les unes des autres. Ainsi, les empreintes digitales ne peuvent par être classées, non plus que les empreintes dentaires, ou le pourtour du crâne, ou tout autre particularité anatomique.

Les principes du système Alphonse Bertillon sont connus et sont d'une simplicité élémentaire. Etant donné qu'on a par exemple 100,000 fiches individuelles à classer, voici comment on s'y prend: on mesure la longueur du crâne, cette mesure est tantôt plus *longue*, tantôt *moyenne* et tantôt *courte*. On fixe par des chiffres la valeur de ces trois termes, et l'on partage la collection des 100,000 fiches en trois tas de grosseur à peu près égale, d'environ 30,000 fiches chacun. On prend ensuite une mesure variant indépendamment de la précédente, soit la largeur de la tête; elle peut être *large*, *moyenne* ou *étroite*, cela permet de diviser chacun des tas de 30,000 fiches en trois sous-tas ayant chacun environ 10,000 fiches. On prend ensuite la longueur du doigt médius (mesuré dans une position déterminée par des instructions très précises), ce doigt peut être *long*, *moyen*, *court*, cela permet de diviser chacun des paquets de 10,000 en sous-paquets d'environ 3,000. Et ainsi de suite, chaque nouvelle mesure permettant de diviser pas trois les paquets résultant de la mesure précédente, conformément au tableau ci-joint.

La *longueur du pied* sert ensuite à diviser ces paquets de 3,000 en paquets de 1,000, la *couleur de l'œil* sert à diviser les paquets non pas par *trois* mais par *sept*, parce qu'en effet nous comptons sept nuances de l'œil très faciles à distinguer nettement. Les autres mesures relevées sur le corps humain sont: *la taille* (mauvaise mesure, très difficile à prendre exactement, et qui ne sert que de renseignement accessoire); *la grande envergure* (la longueur qui sépare l'extrémité de la main droite de l'extrémité de la main gauche lorsque les bras sont étendus en croix: cette mesure n'est pas égale à la taille comme on le dit généralement): *la hauteur du buste* (taille de l'homme assis); la *longueur de la coudée*, enfin la *longueur* et la *largeur* de l'oreille. Finalement, les plus petits paquets ne contiennent plus que très peu de fiches (une dizaine au maximum). Les chiffres inscrits sur ces fiches ne sont pas identiques

100,000 Fiches.

Longueur de la Tête.

Grande. — Environ 30,000.									Moyenne. — Environ 30,000.									Petite. — Environ 30,000.								
Largeur de la Tête.									Largeur de la Tête.									Largeur de la Tête.								
Grande. — 10,000.			Moyenne. — 10,000.			Petite. — 10,000.			Grande. — 10,000.			Moyenne. — 10,000.			Petite. — 10,000.			Grande. — 10,000.			Moyenne. — 10,000.			Petite. — 10,000.		
Médius.			Médius.			Médius.			Médius.			Médius.			Médius.			Médius.			Médius.			Médius.		
gr.	m.	p.	gr.	m.	p.	gr.	m.	p.	gr.	m.	p.	gr.	m.	p.	gr.	m.	p.	gr.	m.	p.	gr.	m.	p.	gr.	m.	p.
3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000

heureusement qu'en vérité ils ne pouvaient plus mal tomber : la taille est, comme il été dit plus haut, une mesure très difficile à prendre exactement ; combien lui est supérieure la longueur de la tête, par exemple qui se prend, sans difficulté, à un demi-millimètre près !

La couleur de l'œil qui est également choisie par ces messieurs, peut se relever avec exactitude, mais elle est, de tous les renseignements relevés par le système de M. Alphonse Bertillon, celle qui exige le plus de soin et le plus d'habitude.

Que dire des cicatrices, graines de bauté, tatouages ou autres, pour déterminer l'identité des personnes? Excellents pour corroborer la certitude de l'identification (et encore à condition d'être relevés avec une précision anatomique), ces signes ne peuvent servir de principe à un répertoire *parce qu'ils ne peuvent être classés.* M. le Dr. Variot, de Paris, a découvert un moyen d'efficacer les tatouages. Si vous faites reposer sur eux le principe de votre répertoire d'identité, vous vous exposez à le voir réduit à rien par la méthode du Dr. Variot.

En résumé : le système Alphonse Bertillon est le seul qui permette de *classer* les hommes d'après leurs caractères somatiques. Il est d'une simplicité élémentaire, ce qui le rend facile à apprendre et presque infaillible.

Il a fait ses preuves à Paris. Il est adopté aujourd'hui dans la plupart des Etats des deux Amériques, en Russie, dans une partie de l'Europe, et enfin une loi est actuellement proposée au Parlement britannique pour en prescrire l'usage dans le Royaume-Uni. Il importe, pour débarrasser le monde des malfaiteurs internationaux (les plus dangereux de tous) que les différents pays puissent faire échange de documents et de dossiers judiciaires ; pour cela, il faut que les descriptions anthropométriques soient rigoureusement uniformes, c'est-à-dire rigoureusement conformes aux *instructions.* Un changement, même, heureux en lui-même, qui y serait apporté, romprait cette uniformité et serait désastreux pour la protection des honnêtes gens.

Il faut donc adopter le système Bertillon, et l'adopter tel qu'il est, sans aucun changement.

DISCUSSION.

Dr. Guillaume (Berne) dit, Il eut à confirmer tout ce qui a été dit sur l'excellence du système Bertillon inventé dans le but d'identifier les criminels récidivistes. Or, la preuve que le système est bon, c'est qu'il intimide les individus de la classe criminelle qui ont mesurés un fois. Ceux-ci émigrent dans un autre pays où le système n'est pas encore introduit. C'est là un raison pour laquelle on commence à l'introduction en Suisse.

Mais pour que ce système soit utile, il faut que dans tous les pays il soit introduit sans changement, qu'il *devienne international* et qu'un *bureau central* soit créé.

Le système Bertillon est aussi destiné à rendre des services dans la vie civile pour assurer l'identification de ceux qui ont p. ex. à prélever un héritage dans un pays lointain.

Results of Anthropometry at Cambridge.

BY

Dr. JOHN VENN, F.R.S.

A few years ago Mr. Galton started an anthropometrical laborat at Cambridge for the purpose of testing the physical characteristics our students. At the time when the results were last collected a analysed it was found that over 2,000 men had been thus examine these observations having been made (it should be remarked) with t same instruments throughout, and mostly under the superintendence the same observer, viz., Mr. White, the librarian of the Philosophi Society.

The following were the instruments selected by Mr. Galton :—

(1.) For measuring keenness of eyesight. The distance w determined at which each eye separately could re "diamond type," *i.e.*, that of the ordinary little shilli prayer-book. As the graduation here stopped at inches—too short a distance for many of the men—t arithmetic average decidedly underrates their power.

(2.) For measuring strength of "pull." Two handles are dra apart, against the action of a spring, in a way analogo to that of drawing a bow.

(3.) For measuring strength of "squeeze." Two handles, thr or four inches apart, are squeezed together against t action of a spring. Each hand is thus separately teste the mean of the two is recorded in my tables.

(4.) Test of breathing capacity. A spirometer is used, consisti of a counterpoised vessel suspended in water. The pers to be tested fills his chest, and expires deeply three or fo times for practice: then, after a few seconds rest, he tri the instrument.

(5.) The height, deducting the thickness of the shoes. This measured to the tenth of an inch.

(6.) The weight. This is determined, in ordinary indoor clothi to a quarter of a pound.

It should be remarked that, in addition to the above, the size of t *head* was also measured, in three directions. As the results thus obtaine however, gave rise to some criticism, which there is no time to ent upon at present, these results are omitted from the present report.

Before analysing the results obtained, a few general remarks may made.

In the first place it must be pointed out that the resort to t laboratory was optional and spontaneous on the part of the students, that what we have here is a sample of the whole. If it be objected th the specially vigorous men may have been too prompt to present ther selves, the answer is, that the results themselves negative any appreciab self-selection of this sort. For instance, in respect of height, where th

verification is easiest, it is found that the very short men present themselves in just about the relative numbers which the "Law of Error" assigns. That is, the men who were (say) four or five inches below the average are as plentiful as those four or five inches above it, and each number is about what it should be in proportion to the total who were measured. Of course if it were commonly known that specimens of one nation or university were going to be compared with those of another we should have to guard against the risk of any unfair selection of this nature.

As regards the general character of our materials, from the statistical point of view, it must be noticed that they are of a very homogeneous nature. The men who were thus measured were exclusively students, with a small per-centage of graduates and resident fellows; nine-tenths of them were between the ages of 19 and 24, and (as everyone familiar with our older universities is aware) they belong, in very great majority, to the upper professional and gentle classes. As every statistician knows, this uniformity of material is of great importance in respect of the trustworthiness of our results when obtained from a comparatively moderate extent of data.

The principal recommendation, however, about such a set of measurements as these consists in the opportunity they afford of attempting an answer to the question, What correlation is there between the mental and the physical characteristics? It need hardly be pointed out how extremely difficult it would be, anywhere else than in our universities, to arrange men in even three broadly distinct classes in respect of their mental capacity. In fact such an arrangement could not be attempted in any way likely to give the slightest satisfaction. In these days, however, of much examination, and with the intimate knowledge possessed by many of the tutors as to the character and ability of their pupils, the difficulty can be largely overcome. The 2,000 men who had been measured in the way above described were sorted out—partly by the examination lists, partly by the tutor's reports—into three classes. The first of these (A) comprises "scholars" and first class men in any tripos. The second (B) comprises those who are capable of any lower "honour degree." The third (C) comprises those who only pass, or fail to pass, for their degree. I am well aware of the objections that may fairly be raised against even such a simple classification as this; and if it were here maintained that each man in the higher class is better than any in the lower, these objections would be fatal. But as against averages—and it is with averages alone, and with those of large numbers, that we are here concerned—they have no force. It is quite certain that these three classes, A, B, and C, as wholes, stand out in marked contrast with each other; and that they correspond to decisive steps in respect of intellectual superiority.

One more point should be noticed before our principal deductions are drawn. The physical characteristics selected for test purposes are necessarily few; and, being chosen for convenient and certain determination, may seem of too special a character to serve as an index of general physical superiority. I think, however, that they may be trusted in this

way, and on the following ground: suppose we take each physical characteristic in turn, and arrange the men in respect of it into 10 successive classes of about the same number, and then compare the distinction of the same men in these distinct classes. What we find is this: each such "first class" consists of men who are distinctly above the average—generally very much above the average—in respect of each of the *other* corresponding classifications. This is not confined to what may seem closely similar characteristics. The men with the best eyesight are taller and heavier than the average. Those who can squeeze hardest with the hand have decidedly superior breathing power; and so on. It seems clear, therefore, that though we only test directly a few isolated capacities, we nevertheless secure indirectly some indication of general physical power. (*See* Table I., page 313.)

The principal conclusions to be drawn from these data are the following:—

I. As regards the physical capacity of the students in general: absolutely, and as compared with a random selection of Englishmen of about the same age.

Perhaps as good data as we have for the purpose of comparison are found in the results of Mr. Galton's measurements at South Kensington a few years ago. When from amongst these we select the nearest approximate group in respect of age (viz., the men between 23 and 26) we find that the Cambridge students are superior in every respect. They are a full inch taller (68·9 against 67·9); they can pull 9 lb. more (83 lb. against 74 lb.); their "squeeze" is 2½ pounds greater (87·5 lb. against 85); their breathing capacity is superior by 35 cubic inches (254 against 219); and they weigh more than 10 pounds heavier (153·6 against 143). All this shows a very decided superiority, and confirms the known fact that the English "well-to-do classes" are exceptionally good in respect of their physical capacity. The difference in breathing power is perhaps the most significant; for not only is it relatively very great, but it is not so directly tested in games as is, for instance, the power of pulling. It is doubtless a result of the abundant out-door exercise habitually taken by the bulk of our school-boys and college students.

II. I must pass on now to the more special and important results obtained by our statistics, *i.e.* those which refer to the correlation of mental and physical power in one and the same general group of men, viz., University students. (I call them students, since nine-tenths of them were between the ages of 19 and 24, inclusive; the remainder were mostly resident graduates.) The clearest way of stating the conclusions is as follows:—

Broadly speaking, with a single exception,—that of the "pulling power" to be noticed presently,—we find that the mental and physical capacities are perfectly independent of each other, within the limits up to which each of these is cultivated on an average by our students. Whether we take the height, weight, power of squeeze, eyesight, or breathing capacity, we find that superiority and defect in these respects are just about as likely to be found amongst the A class as amongst the B and C. This may be tested in two ways. We may, for instance,

begin with the intellectual classes, take the average physical capability, in each respect, of these three classes, and then note how these stand in relation to each other. So taken, no one can say that the A class, as a whole, is either distinctly better or worse physically than the B and C classes.* Or, on the other hand, we may take the high physical class obtained by a selection of the best 10 per cent. from the whole, in each physical test, and then see whether these exceptionally powerful men are distributed in fair average proportions amongst our A, B, and C mental classes. Take, for instance, as a test case, the power of eyesight, the point in which a student might be expected to show the first sign of failure. The average maximum distance at which the A, B, C students can read the small print employed is respectively 23·4, 24·1, and 24·4 inches respectively. There is, it will be seen, a slight deterioration here, but it is too small, as compared with the numbers upon which it is based, to be regarded as certainly significant. Still less can any conclusion be drawn with safety if we adopt the other plan indicated above. If, for instance, we select a small class containing about 10 per cent. of the whole, with the best eyesight, this will be secured by the qualification that they shall be able to read the small print at a distance of at least 35 inches, with the further restriction that the weaker eye of the two can do the same at 33 inches. Such a class comprises 196 men. Now had these been taken indiscriminately from the three classes, A, B, C, the most likely proportions for them to occur would have been 44, 84, and 68. The actual numbers were 46, 88, and 62, which is practically the same thing. So again, if we go to the opposite extreme, and select the very short-sighted men, understanding by this all those who cannot read our type, with each eye, at a minimum distance of 10 inches. The A class has 14 per cent. of such men, the B and C classes 11 per cent.; showing again but a very small difference.

The main point in which an unmistakeable inferiority can be established on the part of the high-honour men is in "pulling power." Their average is 81·5, whilst that of the B and C classes is in each case 84·5. A difference of about 4 per cent. is, after all, small; but it is not small enough to be considered accidental. Presumably it arises from the fact that the non-reading men indulge more in games (such as rowing) which develope this power. I should hardly have expected this, but see no other plausible explanation.

We may conclude then, so far as our data go, that intellectual superiority is not in the slightest significant degree either correlated with any kind of natural physical superiority or inferiority, and that it does not even indirectly lead to any general superiority or inferiority. (*See* Table III., page 314.)

III. There is one other point, of some importance on several grounds, on which our statistics throw some light. This is the age of physical maturity. So far as our students are concerned—and they may

* The actual difference is greatest in respect of breathing power, but I lay less stress on this than on the pulling power, because it does not display itself continuously through all three classes.

question. If physical proficiency is ever brought into competitive examination, we should like to know whether the particular exercise selected is one in which unusual advantage can be secured by those who have sedulously practised it for a short time previously, under the guidance of an accomplished trainer.

TABLE I.

COMPARATIVE EXCELLENCE in different PHYSICAL CAPACITIES.

	Eyes.	Pull.	Squeeze.	Breath.	Height.	Weight.
1st Class. Eyes -	34·6	86·6	83·5	263·2	69·40	157·1
„ Pull -	25.4	113·0	93·9	280·2	69·82	167·3
„ Squeeze -	24·2	96·5	103·7	278·7	70·45	170·1
„ Breath -	24·9	94·3	92·4	320·5	71·19	167·3
„ Height -	25·3	88·0	90·4	286·7	73·25	171·5
Average Student -	24·1	83·5	84·2	254·5	68·94	153·4

This table has been constructed by selecting the best tenth of the total in each of five physical capacities. The columns, other than that for which they have been thus selected, show how the average of this tenth, or "first class," stands in respect of each other such physical capacity. The bottom row of figures gives the average capacity of the whole mass of students from which these first classes have been successively selected. Thus the first class in respect of pulling power can read on the average at a distance of 25·4 inches as against a general student's average of 24·1 inches; they can squeeze 93·9 lb. as against a general average of 84·2 lb., and so on. It will be seen that out of the 25 distinct comparisons thus yielded there is only one case in which great superiority in one respect is not correlated with actual superiority in each other respect.

TABLE II.

PHYSICAL DEVELOPMENT OF STUDENTS in general from 18 to 25.

No.	Age.	Eyes.	Pull.	Squeeze.	Breath.	Height.	Weight.
80	18	24·0	79·2	81·9	237·3	68·72	150·8
276	19	24·8	79·3	81·6	250·8	68·93	150·5
564	20	24·2	82·6	83·6	253·9	69·05	153·3
479	21	23·6	84·0	83·8	257·0	68·96	154·1
353	22	24·6	86·2	86·2	256·6	68·91	154·2
159	23	22·8	84·0	85·0	259·4	69·12	153·5
80	24	24·8	88·4	85·6	255·8	68·73	156·0
143	25	23·3	82·7	84·1	253·2	68·53	155·1

This table contains the total number of students measured, viz., 2,134, arranged in respect of age. If the drift of these figures be displayed diagrammatically, it will be seen that on the whole the maximum physical efficiency is reached at about 22 or 23. To the age of 25 are referred all those who were over 25.

TABLE III.

CLASS A. (487 Men).

No.	Age.	Eyes.	Pull.	Squeeze.	Breath.	Height.	Weight.
10	18	21·3	75·8	75·3	244·0	68·13	142·6
42	19	22·6	75·3	80·9	255·5	69·04	148·0
99	20	23·7	81·2	83·5	252·7	69·00	152·1
104	21	23·6	81·6	82·8	255·2	68·82	152·3
94	22	24·5	83·9	87·1	257·2	68·71	154·0
48	23	21·9	82·0	84·2	262·8	69·11	149·7
33	24	23·6	84·9	84·0	261·5	68·90	154·8
57	25	23·0	80·9	82·7	251·0	68·59	154·6
Average -		23·4	81·5	83·5	235·6	68·85	152·5

CLASS B. (913 Men).

No.	Age.	Eyes.	Pull.	Squeeze.	Breath.	Height.	Weight.
38	18	24·4	77·4	82·1	235·0	68·92	148·5
136	19	25·4	78·7	80·3	249·8	68·78	149·7
280	20	24·0	82·5	84·2	255·1	69·08	153·5
212	21	23·5	83·7	83·7	257·2	68·84	153·0
136	22	24·6	84·7	85·3	257·2	69·17	155·3
54	23	22·7	81·5	83·5	259·0	69·31	154·0
21	24	26·1	90·6	87·4	261·5	68·93	157·7
36	25	22·6	85·8	86·1	264·5	68·83	157·2
Average -		24·1	83·2	84·4	254·9	69·00	152·8

CLASS C. (734 Men).

No.	Age.	Eyes.	Pull.	Squeeze.	Breath.	Height.	Weight.
32	18	24·4	82·4	83·7	238·0	68·68	156·0
98	19	24·8	81·8	83·6	250·0	69·10	152·9
185	20	24·8	83·5	82·8	252·7	69·03	153·6
163	21	23·7	86·1	84·5	258·1	69·23	156·0
123	22	34·4	89·5	86·6	255·5	68·79	155·4
57	23	23·8	88·1	87·2	256·4	68·97	156·2
26	24	25·4	87·4	86·1	244·0	68·35	156·0
50	25	24·0	82·5	84·2	247·5	68·24	154·2
Average -		24·4	85·2	84·5	252·9	68·93	154·8

These tables represent the comparative physical proficiency of the three intellectual classes, A, B, C; at each age, and on a general average. The "squeeze" is the mean of the two hands estimated separately. It will be seen that the high honour, or hard-reading men, are, as a matter of fact, below the two other classes in each respect, but that the difference is very small, and in most cases may be the result of accident.

The Physical Condition of Children seen in Schools, and the Local Distribution of Conditions of Defective Development.

BY

FRANCIS WARNER, M.D., F.R.C.P.

A joint committee of the British Medical Association and the Charity Organization Society having undertaken to draw up a report on conditions of child life, to aid the efforts of the State and those of philanthropy, I undertook to examine 50,000 children* in schools and to prepare statistics. A brief account of the children is here given; other material is presented in Section IV. of this Congress.†

The physical condition of the child-population can only be determined by observation; a general analysis of the points observed is given in Tables III., IV.

The physical signs observed.—The *epicanthis*, a fold of skin abnormally developed across the inner angle of the opening of the eye-lids, giving an appearance of great width between the eyes.

Frontals overacting.—The frontal muscles produce horizontal creases in the forehead, which may be deep if these muscles overact coarsely; sometimes the muscles are seen working under the skin in vermicular fashion with an athetoid movement; in other cases the action is fine, producing a dull forehead. Such overaction does not necessarily erase expression.

Corrugation.—Knitting the eye-brows, drawing the eye-brows together; vertical creases are thus produced. This may co-exist with frontals overacting.

Orbicularis oculi relaxed.—There is a large thin muscle encircling the eye-lids, its tone gives sharpness of outline to the lower lid so that its convexity is seen; its action is increased in laughter. When this muscle is relaxed there is fulness or bagginess under the eyes.

Hand-balance nervous.—Here the wrist is drooped, the palm slightly contracted laterally, the thumb and fingers extended backwards at their junction with the palm.

Hand-balance weak.—In this type of balance the wrist is slightly drooped, the palm contracted laterally, and the digits are slightly flexed. In examples of less degree the thumbs only are drooped.

Lordosis.—When the hands are held out an altered balance of the spine may be seen with arching forward in the lumber region, while the upper part between the shoulders is thrown back.

Mental dulness.—In this particular, reliance was placed on the teacher's reports. I am not responsible for any mental examination.

* Towards the expenses of this investigation grants were made by the British Medical Association upon the recommendation of their Scientific Grants Committee.

† *Vide* Transactions of the Seventh International Congress of Hygiene and Demography, Volume IV., p. 10.

Low nutrition was entered against a case if the child were thin or pale (delicate). The children were not examined medically to ascertain the presence of disease, and no information was recorded as to their feeding.

*Table III. giving analysis of conditions of defective development.**
Table IV. giving analysis of abnormal nerve-signs.

The standard or degree of defectiveness.—In making observations it would be possible to take notes of such cases only as appear to be practically abnormal, describing the facts on which the opinion is grounded. In this inquiry, especially in the schools seen during 1890–91, I tried to record all abnormal conditions seen, whether the child appeared to be abnormal or not. The distribution of abnormal conditions, as well as of exceptional children in the schools was thus determined. It soon became apparent that the conditions of bodily development vary much in different districts; but the cases were not analysed and arranged in groups till the visits to schools were completed, so that I can assure you my mind was ot prejudiced in making observations. The date of each visit has been preserved. In many schools I was struck by the comporative absence of defects in the palate, ears, &c. and conversely by the large number of other particular deviations from the normal. When I found this to be the case, I usually reviewed each child in a group to correct or revise my observations. The abnormal child presents a combination of defects. A single abnormal condition of development, as an isolated fact, is not sufficient evidence to indicate the child's brain as probably abnormal, a child may have a narrow palate and be mentally bright. When several defects in development and in brain action co-exist with a report of mental dulness from the teacher, the child is probably "exceptional", especially if its nutrition be low.

Table V., giving per-centage of conditions of defective development calculated upon the numbers seen in 20 *districts.*—For the purpose of demonstrating the local distribution of defects, as far as my notes go, 66 schools, containing,—boys, 18,137; girls, 16,854; total, 34,991,—are grouped for 20 areas; 12 in London north of Thames, 5 south of Thames, and 3 groups in or around Croydon, Guildford, and Weybridge. From this table it appears probable that certain localities tend to produce a large per-centage of certain defects which are less common elsewhere. The poorer districts do not appear necessarily to produce the worst-made children; thus, for five National schools in Kensington and Chelsea, defects in development were 12·6 per cent.; and for two Board schools in Islington 7·4 per cent. The local circumstances of the groups were not investigated, as not coming within the scope of the present inquiry, but such work appears to be practicable, and it is suggested that exact knowledge as to the local distribution of defects must precede any future attempts to determine their causation, and the possible means of their removal.

* Tables I. and II., which embody other statistics derived from this investigation, will be found in Volume IV., pp. 12 and 14.

Table III.

General Statistical Summary.

General Analysis of Cases seen.

		No. of Children Seen. 1.	No. of Children Noted. 2.	Cases with Defect in Development. 3.	Cases presenting Abnormal Nerve-signs. 4.	Delicate, Pale or Thin (Nutrition low). 5.	Reported by Teachers as Mentally Dull. 6.	Eye Cases: Squints, &c., not Ophthalmia. 7.
I.—XIX. Poor Law District and Separate Schools:— Totals	B.	5,884	1,332	888	889	236	510	205
	G.	3,947	685	475	388	93	281	112
	T.	9,831	2,017	1,363	1,277	329	791	317
X.—XXVIII. Certified Industrial Schools:— Totals	B.	1,588	500	329	332	41	223	54
	G.	407	91	62	57	28	47	20
	T.	1,995	591	391	389	69	270	74
XXIX.—XXXIV. Homes and Orphanages:— Totals	B.	774	172	107	112	14	68	28
	G.	1,049	186	134	112	35	113	27
	T.	1,823	358	241	224	49	181	55
I.—XXXIV. Total of Institutions at which Children are Boarded	B.	8,246	1,994	1,324	1,333	291	801	287
	G.	5,403	962	671	557	156	441	159
	T.	13,649	2,956	1,995	1,890	447	1,242	446
XXXV.—C. Public Elementary and Day Schools:— Totals	B.	18,137	3,462	2,213	2,021	707	1,387	531
	G.	16,854	2,492	1,491	1,406	781	973	453
	T.	34,991	5,954	3,704	3,427	1,488	2,360	984
CI.—CVI. Other Schools:— Totals	B.	501	113	79	59	32	28	18
	G.	886	153	73	111	36	49	25
	T.	1,387	266	152	170	68	77	43
I.—CVI. Grand Total of all the 106 Schools	B.	26,884	5,579	3,616	3,413	1,030	2,216	836
	G.	23,143	3,607	2,235	2,074	973	1,463	637
	T.	50,027	9,186	5,851	5,487	2,003	3,679	1,473

TABLE III.—

Further Analysis

		Analysis of Conditions of Defect in Development.				
		Cranial abnormality.	Palate Defective.	External Ears Defective.	Epicanthis.	Other Defect in Development.
		8.	9.	10	11.	12.
I.—XIX.						
Poor Law Schools:—						
Totals	B.	387	216	257	124	254
	G.	171	133	81	101	160
	T.	558	349	338	225	414
XX.—XXVIII.						
Certified Industrial Schools:—						
Totals	B.	160	67	106	28	122
	G.	40	18	3	3	21
	T.	200	85	109	31	143
XXIX.—XXXIV.						
Homes and Orphanages:—						
Totals	B.	34	32	41	14	27
	G.	79	30	9	18	38
	T.	113	62	50	32	65
I.—XXXIV.						
TOTAL OF INSTITUTIONS AT WHICH CHILDREN ARE BOARDED	B.	581	315	404	166	403
	G.	290	181	93	122	219
	T.	871	496	497	288	622
XXXV.—C.						
Public Elementary:—						
Totals	B.	910	448	621	338	483
	G.	734	332	158	246	400
	T.	1,644	780	779	586	883
CI.—CVI.						
Other Schools:—						
Totals	B.	37	33	22	10	22
	G.	24	12	17	14	26
	T.	61	45	39	24	48
I.—CVI.						
GRAND TOTAL OF ALL THE 106 SCHOOLS	B.	1,528	796	1,047	514	908
	G.	1,048	525	268	384	645
	T.	2,576	1,321	1,315	898	1,553

continued.

of Cases seen.

Analysis of Defective Nerve Signs.											
General Balance Bad. 13.	Expression Defective. 14.	Frontals Over-act. 15.	Corrugation. 16.	Orbicularis Oculi Relaxed. 17.	Eye Movements Defective. 18.	Head Balance Weak. 19.	Hand Balance Nervous. 20.	Hand Balance Weak. 21.	Finger Twitches. 22.	Lordosis. 23.	Other Nerve Signs. 24.
74	259	423	38	121	120	66	93	189	80	36	144
32	146	107	4	66	75	47	55	66	25	45	71
106	405	530	42	187	195	113	148	255	105	81	215
12	56	175	28	30	87	13	35	49	25	14	34
6	21	14	5	5	11	8	5	14	3	4	13
18	77	189	33	35	98	21	40	63	28	18	47
—	17	43	4	12	37	1	2	47	2	2	8
1	31	28	6	10	32	2	9	41	8	6	13
1	48	71	10	22	69	3	11	88	10	8	21
86	332	641	70	163	244	80	130	285	107	52	186
39	198	149	15	81	118	57	69	121	36	55	97
125	530	790	85	244	362	137	199	406	143	107	283
110	344	659	123	351	547	136	404	427	319	124	237
123	254	132	23	243	329	245	415	358	214	202	131
233	598	791	146	594	876	381	819	785	533	326	368
5	18	22	6	8	7	3	16	3	19	8	11
11	22	13	2	19	38	17	32	25	11	22	6
16	40	35	8	27	45	20	48	28	30	30	17
201	694	1,322	199	522	798	219	550	715	445	184	434
173	474	294	40	343	485	319	516	504	261	279	234
374	1,168	1,616	239	865	1,283	538	1,066	1,219	706	463	668

Table IV.

Analysis of Records of 50,027 Children as seen in Schools.

Defects in Development in Corelation with "Abnormal Nerve-signs "Low Nutrition,' and "Mental Dulness," as reported by the Teacher

Total Number presenting each Condition respectively.	Abnormal Nerve-signs.			Low Nutrition.			Mental Dulnes		
	Boys.	Girls.	Total.	Boys.	Girls.	Total.	Boys.	Girls.	Tot
Total of cases presenting defects in development - - - - B. 3,616. G. 2235. T. 5,851.	1,975	1,096	3,071	733	726	1,459	1,398	928	2,3
Cranial abnormalities - - B. 1,528. G. 1,048. T. 2,576.	850	531	1,381	392	480	872	634	477	1,1
Defects of palate - - - B. 796. G. 535. T. 1331.	441	262	703	173	155	328	324	232	5
Defects of external ear - - B. 1,047. G. 268. T. 1,315.	566	128	694	196	72	268	340	103	4
Epicanthis - - - - B. 514. G. 384. T. 898.	227	160	387	65	73	138	192	136	3
Other defects in development - B. 908. G. 645. T. 1,553.	555	355	910	189	172	361	383	263	6

Nerve-signs in Co-relation with "Defects in Development, "Lo Nutrition," and "Mental Dulness," as reported by the Teachers.

Total Number presenting each Condition respectively.	Defects in Development.			Low Nutrition.			Mental Dulnes		
	Boys.	Girls.	Total.	Boys.	Girls.	Total.	Boys.	Girls.	Tot
Total of cases presenting abnormal nerve-signs - - - - B. 3,413. G. 2,074. T. 5,487.	1,975	1,096	3,071	635	598	1,233	1,370	880	2,2
General balance defective - B. 201. G. 173. T. 374.	138	86	224	47	56	103	99	72	1
Expression defective - - B. 694. G. 474. T. 1,168.	493	329	822	191	146	337	369	253	6
Frontals overacting - - - B. 1,322. G. 294. T. 1,616	583	145	728	221	64	285	548	136	6
Corrugation - - - - B. 199. G. 40. T. 239.	105	22	127	45	6	51	91	21	1
Orbicularis oculi relaxed - B. 522. G. 343. T. 865.	361	224	585	112	112	224	208	158	3
Eye movements defective - B. 798. G. 485. T. 1,283.	500	298	798	130	150	280	329	222	5
Head-balance weak - - B. 219. G. 319. T. 538.	151	178	329	46	109	155	97	145	2
Hand-balance weak - - - B. 715. G. 504. T. 1,219.	375	196	571	115	107	222	286	178	4
Hand-balance nervous - - B. 550. G. 516. T. 1,066.	253	205	458	111	158	269	189	170	3
Finger twitches - - - B. 445. G. 261. T. 706.	202	99	301	90	95	185	143	78	2
Lordosis - - - - B. 184. G. 279. T. 463.	92	107	199	36	87	123	72	85	1
Other nerve signs - - - B. 434. G. 234. T. 668.	278	135	413	104	58	162	228	125	3

Table V.

PUBLIC ELEMENTARY SCHOOLS (XXXV.–C.). CONDITIONS OF DEFECTIVE DEVELOPMENT. PER-CENTAGES IN CASES SEEN IN TWENTY DISTRICTS.

This table represents the distribution of cases of "some defects in development." (*See* column 3 in the centre of the table.) Next, it shows the ratio of each defect to the number seen in each area. (*See* columns 8 to 12 on the left hand.) It shows also the ratio of each defect to the cases of mal-development. (*See* columns 8 to 12 on the right hand.)

It must be observed:

(1.) That the data contained in this table are necessarily limited. The children examined in the several areas were comparatively but a small proportion of the child-population of each district.

(2.) That in order to draw final conclusions as to the causation of defects and their distribution in various localities, a much larger number of children must be seen.

The Letters refer to the Groups in Table VI.		Table showing Per-centage of Development Conditions respectively upon Number of Children seen.					Per-centage of Development Cases on Total seen.	Table showing Per-centage of Development Conditions respectively upon the Development Cases.				
		Cranial Abnormality. 8.	Palate Defective. 9.	External Ears Defective. 10.	Epicanthis. 11.	Other Defect in Development. 12.	3.	Cranial Abnormality. 8.	Palate Defective. 9.	External Ears Defective. 10.	Epicanthis. 11.	Other Defect in development. 12.
A. Kensington, Chelsea, Pimlico.	B.	6·4	3·6	5·0	2·0	2·4	15·0	44·5	24·4	33·4	13·4	16·7
	G.	4·1	2·9	1·2	2·8	1·8	9·6	43·1	30·2	12·8	29·3	19·2
	T.	5·4	3·3	3·3	2·3	2·2	12·6	42·7	26·4	26·1	18·8	17·6
B. Marylebone	B.	5·9	2·9	3·1	1·1	2·0	11·6	50·0	25·0	26·9	10·0	17·7
	G.	4·1	2·9	0·9	1·3	3·2	9·5	43·9	31·0	9·4	13·7	34·4
	T.	5·0	2·9	2·0	1·2	2·6	10·5	47·8	28·0	19·0	11·6	25·2
C. St. Pancras	B.	4·2	4·6	5·5	3·8	3 8	15·7	26·8	29·2	34·1	24·3	24·3
	G.	4·4	3·2	1·4	2·7	2·8	11·2	40·0	28·5	12·8	24·2	25·7
	T.	4·3	3·9	3·6	3·3	3·4	13·6	31·6	29·0	26·4	23·8	24·8
D. Strand	B.	4·7	1·6	3·3	0 6	0·8	9·7	48·9	17·0	34·0	6·3	8·5
	G.	6·6	1·7	0·6	1·3	2·2	11·5	61·5	15·4	57·7	11·5	19·2
	T.	5·8	1·7	2·0	0·9	1·4	10·5	55·5	16·0	19·0	9·0	14·0
E. Clerkenwell	B.	5·3	1·5	2·1	1·1	2·8	10·7	50·0	14·2	20·0	11·1	26·1
	G.	4·2	1·0	0·9	1·0	1·9	8·0	53·4	12·5	11·3	12·5	23·8
	T.	4·8	1·2	1·5	1·0	2·3	9·3	51·4	13·5	16·3	11·6	25·2
F. Islington	B.	3·0	1·6	1·3	2·0	2·0	8·2	36·1	19·4	16·6	31·9	25·0
	G.	3·8	0·7	0·6	0·9	2·6	6·6	58·5	11·3	9·4	13·2	39·6
	T.	3·3	1·1	1·0	1·4	2·3	7·4	45·6	16·0	13·6	19·2	31·2
G. City of London	B.	5·2	2·8	3·1	2·0	1·8	11·5	46·0	24·3	27·0	16·2	16·2
	G.	7·4	2·7	0·5	0·8	3·3	12·0	62·0	22·5	4·2	7·0	28·1
	T.	6·6	2·7	1·4	1·2	2·8	11·8	56·4	23·1	12·0	10·2	24·0
H. Whitechapel	B.	4·2	1·9	3·0	1·1	2·4	10·2	40·8	16·8	29·2	11·6	24·6
	G.	3·8	1·7	1·1	1·1	1·8	7·9	49·0	22·5	14·5	14·0	23·5
	T	4·0	1·7	2·0	1·1	2·1	9·0	44·4	19·3	22·6	12·6	23·7

i p. 2596.

TABLE V.—*continued.*

The Letters refer to the Groups in Table VI.		Table showing Per-centage of Development Conditions respectively upon Number of Children seen.					Per-centage of Development Cases on Total seen.	Table showing Per-centage Development Conditions respectively upon the Development Cases.				
		Cranial abnormality.	Palate defective.	External Ears defective.	Epicanthis.	Other defect in development.		Cranial abnormality.	Palate Defective.	External Ears Defective.	Epicanthis.	Other Defect.
		8.	9.	10.	11.	12.	3.	8.	9.	10.	11.	
I. Stepney	B.	5·5	3·1	3·6	2·3	1·3	13·8	40·0	13·0	26·5	17·0	
	G.	4·2	3·7	1·2	1·7	2·2	11·8	35·4	31·2	10·4	14·5	1
	T.	4·8	3·4	2·4	2·0	1·7	12·8	38·0	26·7	18·7	15·9	1
J. St. George's-in-the-East	B.	7·8	1·9	5·8	3·0	4·0	16·8	46·4	11·6	34·8	16·9	2
	G.	4·8	2·7	1·5	1·9	5·2	10·9	44·4	25·4	14·2	17·4	4
	T.	6·4	2·3	3·8	2·4	4·5	14·1	45·7	16·5	27·4	17·1	3
K. Bethnal Green	B.	5·1	3·0	4·4	2·6	3·0	15·0	34·2	20·4	29·6	17·5	2
	G.	1·2	3·1	1·1	1·2	2·0	6·4	20·0	50·0	17·5	20·0	3
	T.	3·3	3·0	2·8	2·0	2·5	10·9	30·4	28·3	26·3	18·2	2
L. Hackney	B.	4·5	5·5	3·9	0·6	1·8	11·2	40·5	48·5	35·1	5·4	1
	G.	9·0	2·5	1·4	1·0	2·5	12·1	72·0	20·0	12·0	8·0	2
	T.	6·1	4·3	3·0	0·7	2·0	11·5	53·2	37·1	25·8	6·4	1
M. Battersea	B.	6·0	2·6	1·8	3·1	3·8	14·0	43·5	18·8	12·3	22·4	2
	G.	3·7	1·0	0·4	1·1	3·2	8·7	65·4	11·9	4·7	13·0	3
	T.	5·9	1·8	1·1	2·1	3·5	11·4	51·8	16·2	9·9	18·9	3
N. Camberwell, Walworth, and Stockwell	B.	6·6	2·5	3·8	1·7	2·9	12·4	53·2	20·2	30·8	13·8	2
	G.	3·0	2·0	1·1	1·6	2·3	7·8	37·2	24·4	13·9	20·9	3
	T.	4·4	2·7	2·2	1·1	2·6	9·7	45·5	22·2	22·7	11·6	2
O. Bermondsey and St. Saviour's	B.	6·2	2·2	3·7	1·4	4·4	13·5	46·1	16·2	27·9	11·0	3
	G.	3·6	1·2	0·5	1·6	1·2	7·0	51·8	18·5	7·4	24·0	1
	T.	5·1	1·8	2·4	1·0	3·1	10·9	47·5	16·8	22·6	14·4	2
P. Deptford, Greenwich, and Woolwich.	B.	3·7	2·0	2·6	1·4	2·4	9·6	39·2	20·7	26·9	14·6	2
	G.	5·3	1·9	0·9	1·3	2·5	9·3	57·0	19·3	10·5	14·9	2
	T.	4·5	2·0	1·8	1·4	2·7	9·5	47·5	20·0	19·2	14·7	2
Q. Lewisham	P.	3·1	1·7	3·1	2·0	2·2	10·0	31·1	17·7	31·1	20·0	2
	G.	6·0	0·5	0·5	1·5	1·0	9·2	67·5	5·4	5·4	16·2	1
	T.	4·5	1·1	1·8	1·7	1·6	9·6	47·5	12·1	19·5	18·2	1
R. Guildford	B.	4·9	2·4	0·9	0·8	2·2	10·4	47·3	23·6	18·4	7·9	2
	G.	5·4	0·3	1·0	0·6	2·5	7·7	70·8	4·1	12·5	8·3	3
	T.	5·2	1·4	1·4	0·7	2·3	9·1	56·4	16·1	16·1	8·0	2
S. Croydon	B.	5·0	2·2	5·0	2·1	2·5	13·6	36·7	16·5	36·7	15·6	1
	G.	2·5	1·2	0·8	1·4	2·2	6·9	36·3	18·1	11·3	20·4	3
	T.	3·9	1·1	3·2	1·8	2·1	10·6	36·6	17·0	31·0	17·0	2
T. Weybridge District.	B.	2·7	2·0	3·2	2·5	2·5	11·6	23·7	17·4	27·7	22·2	2
	G.	3·7	1·5	0·5	2·0	1·6	8·2	45·3	18·6	6·6	24·0	2
	T.	3·2	2·0	2·0	2·3	2·1	10·1	32·0	18·0	20·0	23·0	2
Total number of Cases seen.	B 18,137	5·0	2·4	3·4	1·8	2·6	12·2	41·1	20·2	28·0	15·2	2
	G. 16,854	4·3	1·9	0·9	1·4	2·3	8·8	49·1	22·2	10·6	16·6	2
	T. 34,991	4·6	2·2	2·2	1·6	2·5	10·5	44·3	10·5	10·5	15·8	2

The child-material in the school and the effects of training. Educational boards and school managers may be interested in knowi the kind of material the teachers have to work upon, and allowan should be made for this in assessing the results of their labours. T

character of institutions varies much in this respect. The need for special training and results thereof are indicated by particular nerve-signs which are frequent in some schools while absent from others. The effects of physical training, or its absence, are always observable; and the personal influence of the teachers may be traced.

Nervous children.—The "nervous hand-balance" or "weak hand," with finger twitching and lordosis, are the principal signs of what is called nervousness.

Children dull in school work, and pupils irregular in attendance:—

(1.) There is a class of children who on account of their physical condition are unable to comply with the ordinary conditions of school life;

(2.) Mental dulness may be due to low development, or it may be due simply to deficiency of mental faculty, the brain being otherwise sound and well made.

The attempt has thus been made, upon a limited scale, to take a census of the physical condition of samples of the school population; if this is found useful, it could easily be carried out on a large scale. The State has undertaken the education of children who form one-sixth part of the population, while large numbers who are homeless or helpless have to be provided for. Philanthropy is ever eager to help the children, yet the education of the weaker members, who naturally tend to failure, has never been adequately provided for. It is thought that reasons have been shown for bringing scientific observation to bear upon these questions, which concern the physical and mental status of the nation.

An Examination into the Condition of the Teeth of School Children. Preliminary Report of the Committee appointed by the British Dental Association to conduct the collective Investigation as to the Condition of the Teeth of School Children.

J. S. Turner and W. B. Paterson,
Delegates of the British Dental Association.

The British Dental Association is convinced that if more attention were paid to the teeth of children the general sum of public health and well-being would be materially increased, inasmuch as the disastrous effects frequently produced even in early adult life by the decay and loss of teeth may, in a very large majority of cases, be traced to disease of those organs in childhood. It is, for example, a well-known fact that a large percentage of the young men declared as being unfit for naval and military service are rejected solely on the ground of dental disease such as might with ease have been prevented by a comparatively small amount of proper attention at an earlier age.

The Association felt that it was necessary to show by means o reliable statistics the amount of dental disease existing amongst childre and thereby to demonstrate the necessity of some adequate provisio being made to meet the evil; and also to provide sufficient data whic would convince those in authority that in giving attention to thes matters they would be acting in the interests of the public at large, a well as in those of the children themselves.

The examination of the teeth of school children in a number o schools (mainly reformatories, industrial schools, and the like) throughout the country, is now being conducted by dental practitioner approved of by the British Dental Association in order to obtain statistic for the following purposes:—

1. To acquire a more exact knowledge of the condition of children' teeth at various ages.
2. To show by means of the facts thus acquired the disabilitie under which children frequently suffer in their growth an development, and the important bearing this condition ha upon the future health of the individual.

This important investigation demands for its completion a longe period of time than has yet elapsed since its initiation, but such return as have been made show results which must be of considerable value i the discussion on "the physical condition of children at school," and o special interest which relates to the increase or diminution of any im portant disease; indeed the discussion could not be complete withou some reference to dental caries, which from its very prevalence may b regarded as the dominant disease of childhood, for but a small proportio of dentures are unaffected by it.

It is important to note that this statistical information is not onl of a reliable nature, but is derived from not the practices of denta surgeons or special hospitals, but from the inspection of industrial schools training ships, and other scholastic institutions, and may be taken a typical of the condition of the teeth of the poorer classes both in Englan and Scotland, since healthy teeth and mouths have been as carefull tabulated as the unhealthy.

It must not be supposed that the state of affairs revealed by thes statistics is confined to the lower classes; an examination has only bee made of one school consisting of the children of well-to-do or middl class parents. The number of pupils is unfortunately too small to giv a thoroughly reliable ratio, but it is not without interest that it holds provisionally at least, the distinction of presenting the highest percentag of carious and defective teeth requiring attention.

It is also anticipated that this preliminary report, which is far fro exhibiting the full value of this statistical information, may serve th purpose of calling attention both of the public and the dental professio to a work which is of public utility in such a way as to command thei active co-operation in extending the scope of the present investigation so that finally it may representative of the whole community.

The number of children on which we have to report at present i 2,333, consisting of 1,797 males and 536 females, ranging in age fro

5 to 19 years, mostly between 8 and 15 years, the average age being 11 years 10 months (males 11 years 11 months and females 11 years 5 months).

The importance as well as the difficulty of this investigation may be grasped from the single fact that it has involved the systematic investigation of a very large number of teeth. It will be readily understood that an investigation carried out by examiners from a printed code of instructions who have hitherto had no opportunity of conferring with the committee must include many errors which must be rectified in future reports. This explanation is deemed necessary, as in a certain number of schools the diseases affecting the temporary teeth have not been recorded with the same exactness as those affecting the permanent teeth; not from any disregard of the importance of these teeth, but simply because so many of these deciduous teeth would naturally be lost at a not distant period of time, it was supposed that they did not demand immediate treatment.

The total number of temporary teeth requiring attention, either in the shape of filling but mostly of extraction, was 1,783 (males 1,236, females 547), representing respectively ratios of 687, 1,021, and 764 per 1,000. The number of carious teeth which were savable, and therefore required filling, was 3,330 (males 2,623, females 707). The number of teeth already lost was 604 (males 499, females 105). The number of teeth requiring extraction was 2,411 (males 2,017, females 394). The addition of the figures falling under these three heads shows the total number of teeth affected with caries, and relatively a very small number condemned because of irregularity amounts in the aggregate to 6,345 (males 5,139, females 1,206), representing a ratio of 2,860, 2,250, and 2,720 per 1,000.

A careful consideration of the relations of the antagonistic teeth shows that the smallest fractional part of the denture which can possibly be entertained in any discussion as to the proper radical treatment of the normal dental organisation is either a pair of teeth or a set of four. It is only where the irregularity is not symmetrical, or if symmetrical where some appliance will be inserted for effectually closing the space, or where the age of the patient precludes the reasonable anticipation of any subsequent rectification of the loss, that it can be asserted that radical treatment by the loss of a single tooth is applicable. The subsequent movement of the teeth which results from loss of judiciously applied symmetrical extraction is such that sometimes even an expert may be in doubt as to whether say such teeth as the first molars have ever been extracted.

In order to provide for the beneficent results of such treatment, and to produce uniformity of practice in this, it is calculated that an additional number of 609 teeth might be sacrificed with advantage to the individuals.

It was also found that a certain number of permanent teeth had not been erupted, and judging from the long period which has elapsed from the time when they should have been so, it was considered very

improbable that they should be erupted at any subsequent period. Such absent teeth amounted to 93 (males 77, females 16).

A certain number of cases have been regarded as perfect dentures, although they require cleansing, removal of tartar, or even obstruction of some remnants of the baby teeth.

In estimating the total number of perfect dentures it was found difficult to give any adequate return of those cases occurring during what we may term the eruptive period, owing to the presence of both temporary and permanent teeth in the same mouth.

The total number of completely erupted permanent teeth which may be regarded as perfect, that is no caries being present, and therefore requiring no fillings, was only 159 (males 130, females 29). Although the returns with regard to the eruptive period cannot be regarded as absolutely correct for all the individuals examined, it is worth noting that in all the 2,333 cases only 159 dentures were marked as complete.

Under the heading of retarded eruption or undue retention have been noted, for instance, such clear cases as the following: child, aged 14, upper temporary lateral incisor still persisting, both irregular; and child, aged 12 years and 9 months, right upper permanent lateral incisor shutting within the arch off the lower teeth in consequence of pressure by the still retained temporary lateral incisor. The total of such cases, not always so clear, however, as those just instanced, was 183 (males 136, females 47). This class of case serves clearly to explain how a large number of irregularities of the permanent teeth are absolutely of a preventable nature.

The total number of irregularities of the teeth which were likely to be improved by the process of regulating was 285 (males 62, females 21). A certain number of teeth were found in excess of the normal number, namely, 13 (males 10, females 3); such teeth are not only redundant but absolutely without any functional value. Amongst these children there were 13 (males 8, females 5) cases of hereditary syphilis given, that is, with specific markings of the teeth described by Hutchinson.

That kind of faulty structure which is not ascribable to any specific disease, and commonly known as honeycombed teeth, was evident in 4, 8, 12, or even 16 teeth in 74 dentures (males 56, females 18).

The returns as to the state of the teeth and gums have not been so accurately made, but there is ample evidence to show that a relatively small number of cases were marked as clean, and many as fairly clean, while a very considerable portion of them were either dirty or foul.

Tartar was noted as being present in 51 (males 20, females 31) cases as "little," and 108 (males 98, females 10) cases as "much."

A diseased condition of the gums was noted in a few of the schools and amounted to 30 (males 25, females 5) cases. Abscessed teeth with chronic discharges from sinuses were noted in 25 (males 16, females 9) cases. Several of these cases opened not into the mouth but on the outside of the face, which means, if nothing more, considerable disfigurement for life.

From the apparent frequency of injury to the teeth, mainly in the athletic field, it is curious to note that there were only 27 instances (males 24, females 3) noted of fractured front teeth from various causes.

The following rarer abnormalities or accidents were noted as follows :—

Hare lip, 1.
Cleft palate, 2.
Mouth breather, 1.
Closure of jaws, 1.
Necrosis of bone, 1.
Cicatrical attachments of the cheek to the gum.
Gemination, 1.

It is almost needless to observe that the tooth brush was conspicuous by its absence in almost all the schools, and in only 1 out of 29 where the children were boarded and clothed was the presence of this indispensable toilet appliance noted. One already good and direct effect of the investigation has been the introduction of a tooth brush into several of the schools examined.

In the light of the Government instructions to recruiting officers, by which candidates for the service are rejected because of impaired biting or grinding capacity, the following figures are not without interest. It was ascertained that the biting capacity was lost in only one case, and in three seriously impaired.

With regard to the grinding capacity it was lost in 21 (males 18, females 3) cases on the right side and 18 (males 17, females 1), while in 27 (males 24, females 3), it was lost on both sides of the mouth.

It is impossible to exaggerate the importance of such a revelation as to the prevalence of dental caries in dentures so recently erupted. It is still more appalling when one recognizes that with time and increased age this deplorable state of affairs must inevitably be considerably worse.

Words are inadequate to express the amount of pain and suffering which these figures clearly prove must have occurred, and whose effects in time must be reflected upon some other part of the system, causing a long list of other diseases not usually recognized as having their origin in so simple a matter as the decay of a tooth.

This deplorable state of affairs is bad enough, but it has its element of consolation from the fact that only a small percentage of these cases are beyond the reach of remedial dental surgery, while the majority of them might easily be made efficient with a small expenditure of professional time and skill for each individual.

TABLE showing the aggregate and relative Results of the Examination of the Teeth of School Children.

	Teeth.			Ratios per 1,000.		
	Boys, 1,797.	Girls, 536.	Total, 2,333.	Boys.	Girls.	Total
Temporary Teeth:						
A. Requiring filling	179	219	398	99	409	—
B. Requiring extraction	1,057	328	1,385	588	612	—
Total A. B.	1,236	547	1,783	687	1,021	76
Permanent Teeth:						
C. Carious, savable	2,623	707	3,330	1,471	1,319	1,42
D. Teeth lost	499	105	604	278	196	25
E. Teeth condemned	2,017	394	2,411	1,121	735	1,03
F. Ditto for uniformity	514	95	609	286	177	25
G. Teeth absent	77	16	93	43	20	
Total C. D. E.	5,139	1,206	6,345	2,860	2,250	2,72
Total C. D. E. F. G.	5,730	1,317	7,047	3,189	2,457	3,02
	Cases.					
Dentures (complete) requiring no fillings.	130	29	159	73	54	6
Retarded eruption and undue retention.	136	47	183	·76	88	7
Requiring regulating	224	61	285	159	153	11
Crowded (additional)	62	21	83			
Biting capacity: Lost	1	—	—	2	—	—
Biting capacity: Impaired	3	—	—			
Grinding capacity: Right	18	3	21	19	7	1
Grinding capacity: Left	17	1	18			
Grinding capacity: Both sides	24	3	27	13	6	1

TABLE showing the Average Age according to Sex, Nationality, and in the Aggregate.

	Boys.		Girls.		Total.	
	Years.	Months.	Years.	Months.	Years.	Month
English Schools	11	6	11	7	11	3
Scotch Schools	13	—	11	2	12	8
Total	11	11	11	5	11	10

The Physical Condition of Pauper Children boarded out under the Local Government Orders, 1870, and amended 1889.

BY

Miss FANNIE FOWKE.

The pauper children boarded out beyond the limits of their union under the care of certificated committees, chiefly treated of in this paper, must, according to Local Government Board requirements (Order, 1889), be drawn from those children who are distinguished as "permanents," in contradistinction to the "ins-and-outs." They must be over two years of age, and, if legitimate, orphaned of both parents, either through their parents' death, or by their permanent mental or physical illness, absence from England, or sentence of penal servitude; or deserted by one parent, the other being dead or unable to discharge parental duties from any one of the causes just mentioned. If illegitimate, the death, desertion, permanent absence or illness of the mother alone, brings the child under the operation of the order.

It is sometimes urged that these parentless children are the pick of the pauper class; but the early death or illness, or disgraceful loss or desertion of parents is not an argument in favour of a strong physical or moral constitution in the child, or of favourable conditions in infancy, and it may be safely asserted that these permanents shew, in the great majority of cases, the outward and visible signs of the class to which they belong and the stock from which they spring. They are, generally speaking, of somewhat feeble constitution, have often been very ill-nourished in early childhood, and are stunted and ill-developed in mind and body.

The problem how best to improve this large class of children is one of national importance. They are given in the return of 1889–1890, as 31,958 orphans or parentless only; this does not include a large number of others who are also receiving public relief from various causes. Three solutions are offered—

(1.) To place these children together in large schools, under a rigid system, with as good sanitary arrangements as can be obtained, and with the care and supervision of a large and expensive staff of officers and teachers.

(2.) To act in accordance with those laws which govern the healthy growth of life in all sorts of children, and to place these State children in foster homes in country districts, where they live under natural conditions and have the advantages of home life and training, and are allowed the usual liberty and given the usual teaching of the non-pauper class, with official and voluntary supervision and inspection—a system, very successfully carried out in our great Australian Colonies, long established in France, Germany, and other European countries, and generally known as the boarding-out system.

(3.) Emigration. With this last method we shall not concern ourselves; but I hope to give a short statement of the physical results of the boarding-out system, and to make a brief comparison between the health of the children placed in families and of those kept in the schools.

According to the last Local Government Board Report, 4,366 pauper children are under the boarding-out system in England and Wales. They are scattered throughout the length and breadth of the land, and it is extremely difficult to obtain such precise statistics of their measurements, etc., as would justify any statement of averages of weight, height, etc., specially as this paper was undertaken at a short notice. Circulars were sent to 125 hon. secretaries of certified committees, asking them to fill in forms of weight, height, and to give death-rate, but I have only received these particulars from about seventeen. Many of the others, however, while declining, for very sufficient reasons, to have their children weighed and measured, have given strong assurances of their physical improvement after being for a time under a boarding-out system, and their statement of little, or no serious illness and no ophthalmia is unvarying. Though this information may not have the wished-for scientific precision, I have every reason to trust its accuracy. The lack of the above-mentioned physical data is, moreover, the less to be regretted, as they would have had to be constantly checked by reference to the length of time the committee had been at work, whether it received or refused sickly or diseased children, and many other modifying circumstances, all of which would tend to alter the relative value of the figures.

From the scanty returns I have been able to examine, I should conclude that the children are of the normal weight and height of the children of the very poor of the non-pauper class, or as one secretary briefly put it, "they are like other children." The general testimony is that they are short, especially the girls. There are, however, exceptions, as I find from my returns that four out of seventy girls, three of fourteen and one of twelve, are five feet and over. Only one of these is from a London Union (Croydon), two are Norfolk girls. These exceptions beat those of the boys, as out of forty-nine boys, one only of twelve years attains five feet; their general average, however, is fairly good, being for boys of ten, about 4 feet 4, and at twelve from 4 feet 6, to 4 feet 8.

One committee had occasion to weigh some of its children three years ago, and kindly re-weighed them for me. I find that four girls gained 50 lbs. between them during that period. I also notice that the younger children are generally lighter in proportion to their height and age than the older ones.

Certain peculiarities are mentioned as constantly recurring; for instance, a curious heavy, shuffling gait, which may be the result of ill-fitting heavy shoes, but which disappears after removal from the pauper institution. Also, especially among the girls, a distension and hardness of the stomach, which causes some of the secretaries to speak of improvement in their shape after a few months. The children are all supposed to be sent out with a clean bill of health, after a period of quarantine in

the probationary wards of their workhouse, but many show signs of health-disturbance in skin eruptions, &c., after being first placed in fresh conditions. The secretary of a well-known north country committee gives an interesting account of waiting some months for the cure of a little girl in a London pauper infirmary, from a severe attack of eczema. At last they decided to wait no longer, but to receive the child as she was. She was a pitiable sight on arrival, but within less than a year had so completely recovered that the visiting guardians could hardly be persuaded she was the same child, and inquired after some specific treatment; none had been used except extreme care, and, no doubt, plenty of fresh air and milk.

But the most significant facts concerning the physical conditions of boarding-out children are those obtained by examining the records of some few committees who have been at work for a long time, and using the tests of (1) Death-rate; (2) Cost of medical attendance; (3) Amount of Ophthalmia; (4) Wage-earning capability. Their value will be all the more strongly marked, especially in cases two and three, when we apply the same tests to children of the same class and pedigree receiving their maintenance and training in district schools instead of in families.

K.N. Committee, probably the oldest and largest of all these committees, began to work in 1868. Receives sickly children from several London unions, one being an East End one, also from large manufacturing towns. Total number of children 465, aggregate number of years 2,575. Average duration of residence 5½ years (this may be taken as the general average of the children's stay under any committee). Total number of deaths from May 8th, 1868, to March 31st, 1891, eleven. Average deaths 1 in 232, or a little over 4 per 10,000. Aggregate medical expenditure, and expenditure for sick-room comforts and nursing and surgical appliances, as 4 sets of irons for rickets, spectacles, &c., 454*l.* 3*s.* 5*d.* Average annual medical expenditure per child, 3*s.* 6½*d.* Ophthalmia—several of the children on first reception have shown traces of the disease in granulated eyelids, &c. One severe case, rescued from workhouse infirmary, had been pronounced hopeless, but recovered after treatment in the eye hospital. Complete cure has been effected in all the cases, and the disease not been taken by any one child in the foster homes. Three cases of girls who were attacked with the disease at the age of 13 and whose eyelids showed traces of previous attacks. One was a very severe case, costing the guardians 7*l.* in extra nourishment, medicines, fee, etc., but all these girls made a good recovery and did not spread infection. There have, however, been troubles from the children's eyes other than ophthalmia.

Wage-earning capability. The after-career book, with records from November 1873 to June 1889, of 82 boys and 127 girls, mentions only two boys and seven girls as definitely incapable of sustained and remunerative employment, and these are extreme cases, being mental weakness, epilepsy, and hereditary insanity. Among the wage-earners three are deaf, and one is lame. Though there is, in several cases, a

criminal pedigree, none of the children has been convicted of crime. It must be borne in mind that physical, not moral, disqualifications alone are considered.

C. Committee established 20 years, receives sickly children; takes the children from a West End union from two years, the earliest age at which, at present, they can be placed out. Number of children from June 1871 to May 1891, 126. Death-rate; three girls, orphans, whose parents therefore had died young, and one boy, a deserted child. No records of medical expenditure. Of 49 boys, 11 have been sent to the training ship "Exmouth"; of those who have finished their training, one is an A.B. on an ironclad, another is warrant officer in the Royal Navy, and a third is just sent to the "Impregnable," conclusive proofs that they have attained the standard required for the Navy; this is a rather unusual achievement with this class of boys, no trace of physical defects escaping scrutiny. It arises, probably, from the fact that the boys are from a comparatively good neighbourhood, that they are taken young, but more from the advantage of their country life, the neighbourhood being purely agricultural, with well-built cottages and good gardens.

Ophthalmia. The first batch of 13 children all more or less affected; it, however, soon disappeared without special treatment and without any of the other children being affected, except in one case, where the little boys slept together. They, however, also recovered without much suffering and without treatment. No trouble from ophthalmia since (probably because the children are now sent after a very much shorter stay in the pauper school, or even without entering it at all). Six cases of trouble with eyes other than ophthalmia. Wage-earning capability; 47 doing well out of 49 discharges.

In Scotland, boarding-out has for long been the recognised method of dealing with the State children. It is significant that from 1885 to 1888 the proportion of pauperism to population was 2·4 per cent., while on January 1st, 1888, it stood for England and Wales at 3 per cent.

In Scotland, infants are boarded out, the children being placed out as soon as received; the boarded-out children also are not entirely restricted to permanents as in England; a certain class, corresponding to some of our ins-and-outs, and known as "separates," being also thus treated.

City Parish, Edinburgh, death-rate from ½ to 1 per cent.; last year two out of 260 children died, one being hopelessly ill when received. Average annual cost of medical attendance, medicines, &c., about 2*s.* 6*d.* per head, ranging, during a number of years, from 1*s.* 5*d.* up to 2*s.* 10*d.*, which it reached in consequence of several severe cases. No trouble from ophthalmia; occasionally the children show signs of it when received; they are provided with their special towels, and in a few months at latest declare themselves well. No case of infection spreading. "Children often miserable enough—little bags of bones "often, and we see afterwards how they improve."

Barony Parish, Glasgow. Average number of children boarded out in the country, 390. Death-rate "infinitesimal," being on an average two per annum for last five years. Average cost per head per annum for sickness, 2*s.* 8*d.* No trouble from ophthalmia. The returns of the City Parish, Glasgow, 1888, show that 541 children could be traced after discharge out of 624, and that of these nine only proved unsatisfactory.

Twenty-fifth Annual Report of the Boarding-out Committee of the Cork Union, which also includes infants and sickly children among its boarded-out children. Deaths; two out of 251 in 1889, and these, sickly children when placed out. The report speaks strongly of the contrast in physique between the children boarded out and the same class of children still in the workhouse. (The system was originally adopted in Cork on account of the fearful infant and juvenile mortality in the workhouse.) Ophthalmia is specially an Irish disease, and a medical inquiry into the matter, 1887, gives two cases out of a hundred among boarded-out children, at the same time, however, giving the cases in the workhouse as 74 per cent. in the boys' and 80 per cent. in the girls' school, while in the infant school there was 63 per cent. of eye disease.

Fuller statistics are still needed as to the general average death-rate among boarded-out children, but all the evidence at present received tends to prove that it is low among children from two to fourteen, when boarded out; in country districts in England, not higher than from ½ to 1 per cent.; and much the same for Scotland and Ireland, where infants under two are placed out. The rate of illness is also very low. Ophthalmia nil, except when the children have it when sent out, when it does not spread. About 3 to 4 per cent. seem physically incapable of wage-earning; but this return is doubtful, as many of the committees have not kept after-career records, and the causes of wage-earning failure are evidently as frequently moral as physical.

In the last L. G. B. report, 1889–90, Dr. Bridges has shown the difficulty of obtaining a precise death-rate of the pauper children in the pauper schools. None of these schools receive children under two, and some not under four, years of age. Their conditions, too, vary considerably; some have much more stringent quarantine rules than others. His table of death-rates in the different metropolitan district schools, 1885–89, ranges from 6·0 per 1,000, up to 120·0 (a convalescent school); the highest rate in an ordinary pauper school being 76·5. The deaths from 5 to 10 years of age give a mortality-rate for the period of 21·13 per 1,000, or 4·22 per annum. From 10 to 15, the death-rate for the period is 19·65 per 1,000, or 3·93 per 1,000 per annum. These rates, however, do not include the scarlet fever cases sent to the Metropolitan Asylum's Hospital (two-thirds of the whole) to the number of 340. Reckoning the usual mortality from this illness at 9 or 10 per cent., this gives an additional 30 to 35 more deaths. Nor do the rates include the deaths at the Idiot school at Darenth.

The carefully compiled health-tables of all the metropolitan pauper schools, covering years from 1883 to 1889 inclusive, give a rate of illness showing that over 10 per cent. of the children in the schools are

under medical treatment for different forms of illness, inclusive of ophthalmia. The general average of all the children in the 22 schools (including the Exmouth) is 10,890. The return of medical treatment for the first half of 1883 is 1,631, of which 538 were ophthalmic cases. In the second half of 1885 the general average of illness was only 1,408 cases, but the proportion of ophthalmia was higher, being 576. The other years show very slight variations on these figures; they do not include the outbreak of enteric fever in July 1885, which attacked 322 of the school inmates at Ashford, causing 20 deaths; they are merely general averages. Considering the expense and trouble lavished on these schools, this average is surprising, for the schools are placed in the purest country air, as on the Downs of Surrey or in the lanes of Hertfordshire; the children are sent in with a clean bill of health, their food is sufficient in quantity, and scientific sanitary arrangements are generally made to secure their health. The wage-earning capability of the pauper school children shows a decided improvement of late years. In two reports of the Metropolitan Association for Befriending Young Servants, four out of 100, in one report, and five in the other, are given as physically unfit for service. I have no means of obtaining reports of the boys' after career, but I note a significant sentence in the Rev. Dr. Clutterbuck's report (Inspector of the Poor Law Schools). "Unfortunately, a very large percentage of the children in Poor Law institutions is, and ever must be, a public burden, chiefly through inherited physical infirmity."

The records of those in charge of the pauper children, not in Poor Law institutions, will, I trust, in time throw some light on this deeply interesting problem of how far their sad personal heritage can be modified by early and complete change of environment and influence, by transplanting them from the degrading surroundings of squalid poverty and vicious and criminal associations, to wholesome natural family life, with its stimulating example of daily work and daily duty. So far as it is as yet possible to judge, it would seem that the stern doctrine of scientific Calvinism is not verified with many of these children, provided only that the bad traditions can be broken while the growing mind is still sensitive and the growing body able to acquire a strong development. But the work is not easy, and requires great patience, judgment, and experience. Many of the secretaries of certified committees state that they find the ages of 13—14 specially critical, the old mischief caused by inherited disease, or early deprivation, then again often asserting itself, so that renewed care and watchfulness are necessary. All evidence, not limited to the United Kingdom of Great Britain and Ireland, but Colonial and European also, is in favour of the children being placed out as young as possible; and, on this point, an amendment in the last boarding-out Order is still to be wished, as there is every reason to believe that the children would gain in physique if not kept in the workhouse nursery at all.

DISCUSSION.

Mr. G. Cunningham, M.A. (Cambridge) said that in 100 infants from two to five years of age, only about 25 per cent. of the dentures were found free from caries, and in one school of 186 infants near Leeds only three mouths had no carious teeth. As to the influence of sex in the prevalence of caries, there seems to be no great difference in the liability except in a few detailed points, which will receive future investigation. The incidence of caries as it affects the right and the left side of the mouth is practically symmetrical, while there is a great difference in the way in which it affects the individual teeth in the upper and the lower jaw. He endeavoured to express in a diagram some of the most important features of the tables, such as the rate and number of the molars erupted and compared with the incisors. These teeth are practically exposed to the same extrinsic condition which cause caries for nearly the same period. Within a year of eruption of the upper 1st molar, 16 are decayed out of the 55 teeth erupted; within a second year, 45 out of the 93, and within the third year, *i.e.*, at 8·6 years, over 56 of 97 teeth erupted. The lower molar erupts shortly before the upper, but much at the same rate ; but the caries is more rapid and more serious, being respectively 20, 55, and 70 teeth out of the less than the 100 erupted. The central incisors were not affected by caries at all. This proves that the caries is due to intrinsic rather than to extrinsic causes, since the extrinsic conditions are same. The intrinsic causes are difference in shape of tooth and in quality or defects, such as enamel fissures. These defects can be remedied at this important period with the minimal cost and the maximal effect. The individual tooth is worth little without an antagonising tooth, and the denture is the unit to be preserved in its integrity. The preservation of the first molars is essential, and the time of intervention is evident.

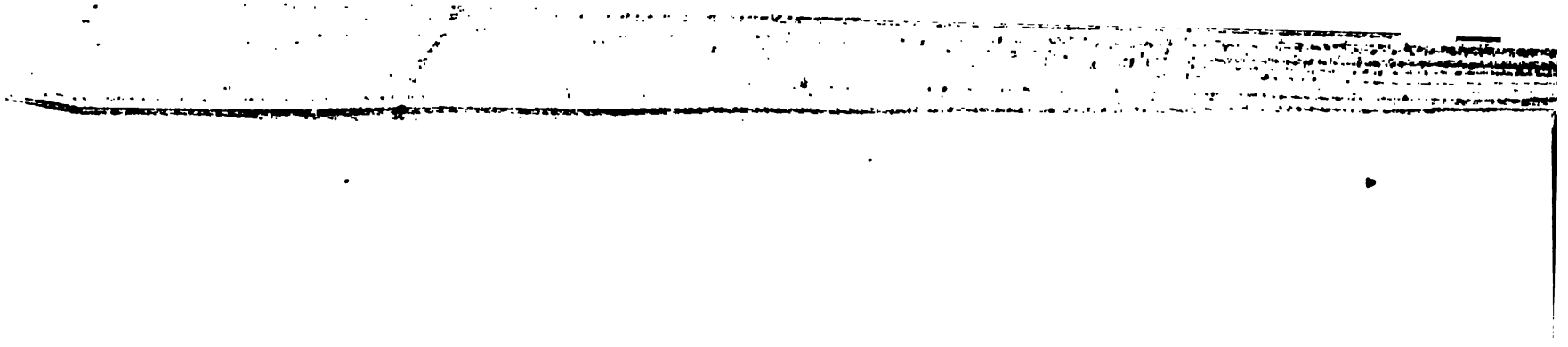
The dental professor would hail with satisfaction such an inquiry as that of Mr. Wilberforce Smith as to the early failure of pairs of grinding teeth and give it their best consideration. He demurred to the suggestion that dentists had not done their duty in calling public attention to the matter; the British Dental Association had spent money and distributed literature, but they were tired of meeting general and medical indifference.

He concluded by pointing out that the origin of the British Dental Association inquiry took place some years ago in the papers of Mr. W. H. Fisher, of Dundee, whose name was necessarily and for all time identified with the movement.

Dr. Fletcher Beach (Dartford) said that Dr. Warner's examination of 50,000 children was very important, but a much greater number require to be examined. It seemed strange that the children of good districts, such as Kensington and Chelsea, should present more defects than the low-class districts in the East End of London. If more children were examined, we should find out what are the causes of this, and whether there is any fallacy which should be made out. He was glad to find that the London Board School had made arrangements for teaching the feeble-minded, and he hoped that this example might be followed throughout the country. There was a precedent for this, for in Norway and Germany special schools have been established, and for some years have been in operation, and it is found that half the number of children are sufficiently improved to be able to earn their own living. If this result is gained also in England, the State may be congratulated. It is found that many feeble-minded children as

Dr. Georg von Mayr (Munich) proposed, and **Professor F. von Juraschek** seconded the following *Resolution*, which was carried:—

"This Division of Demography recommends the collection of the following statistical facts and the development of the same—A. In those countries in which an official insurance of the working-classes exists: I. As regards *Sick Insurance*. (1) The insured should be classified as to sex, age, conjugal condition, and occupation. (2) The actual occupation of the insured; his position in such occupation; the length of time he has been engaged in it; and also his previous occupation (if any) should be noted (3) The duration of his insurance should be ascertained. (4) With reference to diseases that terminate fatally, the duration of such illnesses should be noted, together with the time of their appearance and the cause of death. II. As regards *Insurance against Accidents*. The same *data* will be required as in the foregoing class; and, in addition, a record should be made of the nature, gravity, and consequences of the accident, the time of its occurrence, and the industrial arrangements obtaining when it occurred. III. Statistics should be given of the wages paid to each workman and of his hours of labour. IV. Such statistics should be kept for each branch of industry, and should be made up every half year. V. The statistics referred to should be prepared in a central office or labour bureau, after consulting the employer and the workman as to the correctness of the same. B. In those countries in which no official insurance of the working-classes prevails, the same data as above should be furnished.



INDEX.

A.

Page

Address, Presidential. (Francis Galton, F.R.S.) - - 7
Anglo-Indian Children, The Growth and Development of. (Dr. G. M. Giles) - - - 184
Anthropometric Method (Bertillon's), introduction into United States of - - - 294
Anthropometrie appliquée à l'Identification des Personnes, Résultats statistiques de l'. (Dr. Jacques Bertillon et Dr. Alphonse Bertillon) - - - - 303
Anthropometry at Cambridge, Results of. (Dr. John Venn) - 308
——, Table showing comparative excellence in different physical Capacities - - - 313
——, Table showing comparative physical proficiency of three intellectual classes - - 314
——, Table showing Physical Development of Students in general from 18 to 25 - - 313
Arbeiterversicherung, Bericht ueber die sozialstatische Ausbeute der. (Dr. Georg von Mayr) - - 84
——, Oeffentlich-rechtliche - 86
Arbeiterversicherungswesen ausser der oeffentlich-rechtlichen Zwangsversicherung - - 94
Arlidge (Dr.), remarks in discussion on The Relations of Mortality to Occupation - - 66

B.

Bahadhurji (K.N., M.D.), Analysis of Mr. Holt Hallett's paper on Factory Legislation in India - 245
—— ——, Factory Labour in the Indian Spinning and Weaving Mills - - - 235
Balfour (Graham), Resolution seconded by - - - 336
Barbadoes Whites, history and origin of - - - 182
Barcelone, Réduction de la Mortalité des grandes Cités: Application à. (P. Garcia Faria) - 113
——, Succinct examen de - - 117
Bash (Dr.), remarks in discussion on The Relations of Mortality to Occupation - - - 67
Beach (Dr. Fletcher), remarks in discussion on the Physical Condition of Children - - 335
Bericht ueber die sozialstatische Ausbeute der Arbeiterversicherung. (Dr. Georg von Mayr) - 84
—— ueber eine Lepra-Enquête in Egypten. (Franz Engel Bey) - 196
Bertillon (Dr. Alphonse) et Bertillon (Dr. Jacques), Résultats statistiques de l'Anthropometrie appliquée à l'Identification des Personnes - - - 303
——, (Dr. Jacques), De la Morbidité et de la Mortalité par Professions - - - 23
Board and Lodging of London Work-Girls, The. (F. H. Whymper) - - - 76
Boehmert (Professor), remarks in discussion on The Relations of Mortality to Occupation - 66
—— ——, remarks in discussion on Thrift - - - 108
Bombay Sanitary Commission, 1884, Report of - - 227
Britain, Thrift in Great. (Rowland Hamilton) - - - 67
British Dental Association, Preliminary Report as to the Condition of the Teeth of School Children of the Committee appointed by the. (J. S. Turner and W. B. Paterson) - - 323
Brousse (Dr. Paul), Resolution proposed by - - - 336
Building Societies, objects of - 74

Page

Étrangers dans les villes, Les, Tableau - - - - - 146
—— en France, Les - - - 143
—— La Demographie des - - 144
——, La moralité des - - - 145
Ewart (Dr.), remarks in discussion on European life in the Tropics - 185
Examination into the Condition of the Teeth of School Children. Preliminary Report of the Committee appointed by the British Dental Association to conduct the collective Investigation as to the Condition of the Teeth of School Children. (J S. Turner and W. B. Paterson) - - - 323

F.

Fabriques au point de vue Sanitaire, Du Travail dans les. (Prof. M. Kowalkowsky et M. B. Swiatlowsky) - - 255
Factories, Medical Opinions upon the Hours of Labour in Indian - 227
——, necessity for the application of sanitary measures to large - 128
——, The effect of reduced Working Hours in - - - - - 229
——, The protection of Workmen in, and its Promotion by Museums of Industrial Hygiene. (Dr. Migerka) - - - - 110
Factory Act, India, of 1891 - 219, 222
—— and Workshops Act, reasons for non-application of English to India - - - - - - 224
—— Labour in the Indian Spinning and Weaving Mills. (K. N. Bahadhurji, M.D.) - - 235
—— Legislation in India, Analysis of Mr. Holt Hallett's paper on. (K. N. Bahadhurji, M.D.) - 245
Faria (P. Garcia), Réduction de la Mortalité des grandes Cités: Application à Barcelone - - 113
Felkin (Robert W., M.D.), Tropical Highlands: their Suitability for European Settlement - - 155
Finger-prints and their Registration as a Means of Personal Identification. (Francis Galton, F.R.S.) - - - - - 301
Fleury (Docteur C. M.), De la Mortalité des Mineurs des Armuriers, et des Passementiers, à St. Étienne, 1880-1889 - 57

Page

Földes (Dr. Bèla), Remarques sur les Périodes d'Observation dans les Recherches démographiques - 258
Foresters, The Ancient Order of - 71
Fowke (Miss Fannie), The Physical Condition of Pauper Children boarded out under the Local Government Orders, 1870, and amended 1889 - - - 329
Français hors de France en Europe et les étrangers dans les États européens, Les - - - 151
Friendly Societies - - - 70

G.

Galton (Francis, F.R.S.), Finger-prints and their Registration as a Means of Personal Identification - - - - - - 301
——, Presidential Address - 7
——, remarks in discussion on the Influence of Parental Age on the Vitality of Children - - 292
Geography, Influence of Clays and Limestones on Medical, illustrated by the Geographical Distribution of Cancer amongst Females in England and Wales. (Alfred Haviland) - - - - - 186
Geology upon Health, and upon the Distribution of Disease, The Influence of. (W. Topley, F.R.S.) - - - - - - 195
Giles (Dr. G. M.), The Growth and Development of Anglo-Indian Children - - - - - 184
Greenleaf (Lieut.-Colonel Chas. R.) and Smart (Major Charles), Personal Identity determined by Scars and other Body Marks - 294
Greulich (Herman), remarks in discussion on Thrift - - - 106
Grimshaw (Dr.), remarks in discussion on Migrations in France and in Europe - - - 153
Growth and Development of Anglo-Indian Children. (Dr. G. M. Giles) - - - - - - 184
Guillaume (Dr.), remarks in discussion on the Statistics of Anthropometry - - - 307

	Page
Migerka (Dr.), The Protection of Workmen in Factories, and its Promotion by Museums of Industrial Hygiene	110
Migrations en Angleterre, en Allemagne et dans les autres États européens, Les	149
—— en France et en Europe, Les. (M. Levasseur)	131
Milliet (Dr.), remarks in discussion on European life in the Tropics	185
——, remarks in discussion on the Relations of Mortality to Occupation	62
——, remarks in discussion on Thrift	108
Mills, Amount of rest allowed and taken during the day in Indian Spinning and Weaving	233
——, amount of work done by each individual per Day, *i.e.*, the Amount of Physical Energy put forth per day, and the Nature of the Work generally and the Manner in which it is executed in Indian Spinning and Weaving	234
——, Hours of Work in Indian Spinning and Weaving	232
——, Periodic Change of Work and Visits to the country in Indian Spinning and Weaving	235
——, Physical Condition of Operatives in Indian Spinning and Weaving	238
——, restrictions under which Work is exacted in Indian Spinning and Weaving	232
——, Sufficiency or otherwise of Wages in Indian Spinning and Weaving	236
——, The Conditions of Temperature, Atmospheric Moisture, Ventilation and Light in Indian Spinning and Weaving	236
——, The Habits and General condition and Life of the Class of People to which the Mill-hands belong in Indian Spinning and Weaving	237
——, The Number of Actual Holidays in a Year and the Period of Absence from Work during a Month in Indian Spinning and Weaving	235
Moore (Surgeon-General Sir William), The Suitability of Tropical Highlands for European Settlement	165
Morbidité et de la Mortalité par Professions, De la (Dr. Jacques Bertillon)	23
—— par Âge	26
——, Table de	24
Mortalité absolue par mois pendant la décade de 1880–89	126
—— par profession. Comparaison des quatre principales Tables de	32
—— des Mineurs, des Armuriers, et des Passementiers, à St. Étienne, 1880–1889, De la. (Docteur C. M. Fleury)	57
—— comparée des Mineurs, Armuriers, et Passementiers à partir de l'Âge de 15 Ans	61
—— comparée des Mineurs en Passementiers et Âge moyen pour les principales causes de Décès	60
—— par Profession. Difficulté de construire et d'interpréter une Table de	28
—— par Professions, De la Morbidité et de la. (Docteur Jacques Bertillon)	23
—— par Professions et par grands groupes d'Âges comparée à Paris, en Angleterre et en Suisse	52
——, Sur 1,000 Individus du Sexe Masculin de chaque Âge, et de chaque Profession, combien de Décès en un An, Paris, 1885–1889	54
——, tableau rélatif au periode de 1880–89 à Barcelone	120
Mortality, causes of high	15
—— from Phthisis and Lung Diseases of Men (45–65 Years) working in pure and in vitiated Air, Table showing comparative	17
—— from Phthisis and Respiratory Diseases of Men in various Dust-inhaling Occupations, Table showing Comparative	19
—— in relation to Occupation. (William Ogle, M.D.)	12
—— of Europeans in hot climates, decrease of in recent decades	172

Page

Résultats statistiques de l'Anthropometrie appliquée à l'Identification des l'ersonnes. (Dr. Jacques Bertillon et Dr. Alphonse Bertillon) - - - - - 303

Results of Anthropometry at Cambridge. (Dr. John Venn) - 308

Richards (J. Peake), remarks in discussion on the Physical Condition of Children - - 336

Russie, Le Travail à Domicile en. (Madame Alexandra Tkatchef) - 246

S.

St. Étienne, De la Mortalité des Mineurs, des Armuriers, et des Passementiers, à 1880–1889. (Dr. C. M. Fleury) - - 57

Savings Banks, advantages of - 68

Schloss (David F.), remarks in discussion on Thrift - - 106

"Sharing out clubs" as a form of thrift - - - - - 69

Singer (Dr.), remarks in discussion on the Influence of Parental Age on the Vitality of Children - 292

Smart (Major Chas.) and Greenleaf (Lieut.-Colonel Chas R.), Personal Identity determined by Scars and other Body Marks - 294

Smith (Adolphe), Resolution seconded by - - - 336

Spinning and Weaving Mills, Factory Labour in the Indian. (K. N. Bahadhurji, M.D.) - - 232

—— ——, Hours of Work in Indian - - - - - 232

Stokvis (Prof. Dr.), remarks in discussion on European life in the Tropics - - - 185

Suitability, The, of Mountainous Regions and of Islands in the Tropics for European Settlement. (Clements R. Markham, C.B.) - 178

—— of Tropical Highlands for European Settlement. (Surgeon-Gen. Sir William Moore) - 165

Swiatlowsky (M.B.) et Kowalkowsky (Prof. M.), Du Travail dans les Fabriques au point de vue Sanitaire - - - - - 255

T.

Page

Tait (P. M.), remarks in discussion on Thrift - - - - - 107

Teeth of School Children, An Examination into the Condition of the. (J. S. Turner and W. B. Paterson) - - - - - 323

—— ——, Table showing the aggregate and relative Results of an Examination of the - - 328

Thrift in Great Britain. (Rowland Hamilton) - - - - - 67

Thwaite (B. H.), The Economic Advantages of Industrial Hygiene - - - 127

Tkatchef (Madame Alexandra), Le Travail à Domicile en Russie - 249

Topley (W., F.R.S.), The Influence of Geology upon Health and upon the Distribution of Disease 195

To what extent are Tropical Altitudes adapted for Settlement by Europeans. (C. L. van der Burg, M.D.) - - - - 170

Transports, Mortalité de - - 43

Travail à Domicile en Russie. (Madame Alexandra Tkatchef) - 249

—— dans les Fabriques au point de vue Sanitaire. (Prof. M. Kowalkowsky et M. B. Swiatlowsky) - - - - - 255

Tropical Highlands: their Suitability for European Settlement. (Robert W. Felkin, M.D.) - 155

Tropics for European Settlement, On the Suitability of Mountainous Regions and of Islands in the. (Clements R. Markham, C.B.) - 178

——, Possibility of the propagation of pure Europeans in the - 177

Trustee Savings Banks - - 70

Turner (J. S.) and Paterson (W. B.), An Examination into the Condition of the Teeth of School Children. Preliminary Report of the Committee appointed by the British Dental Association to conduct the collective Investigation as to the Condition of the Teeth of School Children - 323

U.

Unfallversicherung - - - 8

V.

	Page
Valliant (Dr.), remarks in discussion on The Relations of Mortality to Occupation - - - -	62
van der Burg (C. L., M.D.), To what extent are Tropical Altitudes adapted for Settlement by Europeans - - - - -	170
Venn (Dr. John), Results of Anthropometry at Cambridge - -	308
Vie humaine, La - - - - -	122
Villes, Déplacement des campagnes vers - - - - - -	131
von Juraschek (Prof. F.), remarks in discussion on Thrift - -	107
—— —— Resolution seconded by	337
von Mayr (Dr. Georg), Bericht ueber die sozialstatistische Ausbeute der Arbeiterversicherung -	84
—— ——, Resolution proposed by	337

W.

	Pa
Wadia (The Hon. N. W.), remarks in discussion on Factory Labour in the Indian Spinning and Weaving Mills - - - -	2
Warner (Francis, M.D.), The Physical Condition of Children seen in Schools, and the Local Distribution of Conditions of Defective Development - - -	3
Whymper (F. H.), The Board and Lodging of London Work-girls -	
Work-girl Employers, Life in the Establishments of - -	
Work-girls, Life in "Homes" -	
——, Life in private Lodgings -	
——, The Board and Lodging of London (F. H. Whymper) -	

Z.

Zones, Colonization - - -	1
——, influence of the climatological, upon disease - - -	1

LONDON: Printed by EYRE and SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on or before the date last stamped below.